JOURNAL

OF

THE MILITARY SERVICE INSTITUTION

OF THE

UNITED STATES.

[COLONEL WM. H. POWELL, U. S. A., EDITOR.]

"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—SHERMAN.

VOL. XXVII. NOVEMBER, 1900. NO. CVIII.

SOME RANDOM NOTES ON THE FIGHTING IN THE PHILIPPINES.

BY LIEUT. COLONEL JAMES PARKER, 45TH INFANTRY, U. S. VOLS.
CAPTAIN 4TH CAVALRY.

THE Philippine Islands like all other countries have their alternations of hill, valley and plain; but the prevailing feature of the Islands, in those parts in which our troops have most operated, is the rice plain. In the high mountains live tribes of savages; in the foothills the population is sparse, but about the rice fields cluster a dense population, since it is here that the principal food of the people is produced. Here, accordingly, most of our fighting has taken place.

The rice fields, which were no doubt, originally swamps, border the sea, the rivers, and the lakes. They are usually intersected by numerous streams, each bordered by shallow thickets of bamboo and bushes. Each field is divided, by raised dykes, into a number of plots, one hundred or more feet across, constructed to retain the water and thus favor the growth of the rice. A road across a rice field is therefore in no degree different from a causeway across a morass. In the wet season the dyked plots, called "paddy fields," being full of water and mud, an advance under fire becomes extremely difficult; the troops must either walk on the road, which is generally raised, or through the paddy fields, the dividing dykes being usually

on top, too narrow and slippery to walk upon. While the successive lines of dykes afford cover to an attacking force, the difficulties and exhaustion attending such an advance, are extreme; the troops actually stagger forward from one pond of water to the next, laboriously drawing out of the tenacious mud, one foot after another; the soldiers, on reaching the next dyke, throwing themselves down behind it in a great splash of mud and water; haversacks and blanket rolls become too heavy, in their soaked condition, to be carried, and are thrown away; the wounded men, struggling in the mud, are often in great danger of drowning or being suffocated; the fall of bullets is made visible as well as audible by the splash they make in the water. The only dry spot is the road, which has become an avenue for projectiles.

In the higher ground which intervenes between the rice plains and mountains, the country, when not cleared for cultivation is grown up with very high grass and bushes, producing what might be called a jungle—this undergrowth can be traversed by scouts and flankers, but with difficulty, and it affords an excellent lurking place for a concealed enemy. Of this nature is a large portion of the province of Cavité, where, in addition, numerous deep cañons occur.

The roads, both in the rice plains and on the higher ground, are usually abominable; from a ditch alongside, the soft dirt is thrown into the middle, the road rarely containing any stone or gravel. The annual road tax of the Spaniards, three dollars Mexican, or in lieu, fifteen days' work, if regularly enforced, would have resulted in as good roads as might be desired; but the cash and labor was usually appropriated to other uses. Under the insurgent government, apparently, no attention at all was paid to either roads or bridges; we therefore found them in a horrible condition, and nearly all the bridges washed away. The only exception to this rule, seen by the writer, was the road leading from the railroad near Dagupan to the northern end of the island. We found that this road, some weeks before our arrival, had been prepared for the flight of Aguinaldo; bridges and track were in fine order.

All of the country roads, and many roads designated as "high" roads, are mere mud tracks in the wet season and little

more than trails in the dry season. With the native, the favorite form of conveyance over such roads is the mud sled, something like our "stone-boat," drawn by a Carabao. The "hill-cart" is used where the roads are better and the loads are heavier. It also is drawn by the Carabao, a clumsy, ridiculous looking, amphibious beast, that can pull at the best, only a mile and a half per hour, and which has to be rested and bathed two or three times in a day's march, which seldom extends over ten miles.

On most of the roads and trails, the troops were obliged to march in single file only; a regiment thus trailing out for a thousand yards, or more. In the wet season, flankers were out of the question, except in the immediate presence of the enemy; we were forced to be content with an advance guard, marching, like the rest of the column, in a column of files or twos—in such a formation rapid marching is impracticable.

Next to the roads the greatest difficulty encountered by our troops was the climate. The first part of the dry season is moderately cool, the latter part is immoderately hot; and the rainy season is hot and intensely humid. The air lacks vitality; undue exertion exhausts the men and takes the heart out of them. The poor roads, the obstacles on the line of march, protract the march; a midday halt of two hours is a necessity; the soldier starting at daylight, arrives in camp at dark, with but ten or twelve miles accomplished. Frequent rests are necessary. The soldier's rifle and belt weigh 15 lbs.; his three days' rations and haversack, 10; his blanket and poncho, 7; his canteen, filled, 4. After two or three hours' march under this load of nearly 40 lbs. men are continually dropping out of ranks, overcome by heat and fatigue. Marching infantry in the Philippines is dreadful work. A march of 12 or 15 miles in this country is a *forced* march.

THE INSURGENT FORCES.

When movement of supplies and of troops is hampered by such obstacles as these, operations of large forces are out of the question. Hence it was found that the Filipino troops were mostly *local* troops; the garrisons of the towns were composed of men who lived there or thereabouts; the exception to this rule being the large forces which were gathered by the

insurgents north of Manila, to obstruct the advance of our army, and which the railroad supplied. Without the railroad, or if the railroad in their rear had been cut, this force could not have held together for a week, for lack of food.

Their troops were usually organized into battalions of four or more companies each, with the usual proportion of officers and about 100 enlisted men to a company. Their rates of monthly pay in our money were major general $30, brig. gen. $25, colonel $20, lieut.-col. $17.50, major $15, captain $12.50, 1st lieutenant $10, 2d lieutenant $7.50, sergeant $3, corporal $2.25 and private soldier $1.52. It must be confessed that pay was not the only inducement to the Filipino soldier! They also received a ration (principally rice), and clothing.

They were armed with the Mauser rifle, cal. .27, and the Remington rifle, cal. .44, the last shooting black powder. One great difficulty appeared to be lack of ammunition; this they attempted to remedy by reloading the fired shells. The .45 calibre American cartridge shell was often made use of, being converted into a .44 calibre shell by cutting a slit lengthways, resizing and soldering. They seemed to be in great straits for good powder and in some instances the chemical on the end of safety matches was used, apparently making a fair explosive. They seldom attempted to reload the Mauser cartridge. As a result the Mausers carried well; the Remingtons did poor shooting.

A force armed with rifles usually had in attendance a force of equal size armed with bolos. These, in a fight, stood ready to take the place of riflemen if hit, and to carry off the wounded and dead. In some cases the insurgents gave these bolomen wooden guns, in appearance exactly like a Mauser. At Tayug one poor fellow was killed making a brave stand with a wooden gun.

The bolomen seemed to be recruited from the more ignorant element of the population. In the northern provinces of Luzon there was not, at first, much trouble with the bolomen; but in the south of Luzon, and in the other islands, the bolomen seemed to have no conception of the tremendous power of the rifle. Hence they often boldly charged our troops,

paying dearly for their experience. In south Luzon the bolomen often arrayed themselves in armor, made of the thick hide of the Carabao; in helmet and cuirass, with a shield in one hand and a bolo brandished in the other, they would advance on our men, or else strike an attitude of defiance, looking like "knights of old." Poor fellows—it is said that the bullet striking against their armor, was like the sound of a big base drum.

There is no question that these ignorant bolomen owed their bravery largely to fanaticism inspired by the native priests and enhanced by the liberal issue of relics, amulets, spells, etc.

But reverting to what may be called the Filipino regular troops, armed with rifles, there is no question that they would be brave if commanded by competent officers. The experience we have had of the Macabebe and Filipino scouts has shown us that. But the Filipino officer, often accustomed to a life of luxury, often a half-breed, a small dealer, a hanger-on of the Spaniards, does not seem to be brave. And then we had the *morale* on them. Whatever may be the reason, the Filipino knew before the fight commenced what would be the issue; whatever were the odds, whatever our losses, our men would not be denied. (It is a curious fact that up to the date when this was written, there has never been a case where a body of American troops, no matter how small, has surrendered to the insurgents. Compare that with the Spanish record!) And so, if the hot fight lasted a half an hour or forty-five minutes, the retreat was sure to begin.

Not much can be said for the shooting of the Filipino troops. Otherwise our losses, in unprotected advances over rice plains, would have been enormous. Certain battalions shot better than others; there were unquestionably also some sharpshooters; part of the troops had been in service under the Spaniards, and had received musketry training. In many fights they commenced with volleys which degenerated soon into file firing. It was usually remarked that they did their greatest execution at long ranges, from 800 to 1000 yards; that as soon as our troops, in their forward movement, had passed this zone, the casualties greatly diminished. It was often evi-

dent that their officers had measured the ranges before-hand, and that they were marked by a line of telegraph poles and stakes, running from the trenches in the direction of the probable attack. The trenches were often prepared, too, so that if a rifle were laid on the parapet, the slope of the upper surface of the parapet coincided with the degree of elevation required for say 800 yards, thus making accurate individual aim unnecessary, the soldier simply resting his gun on the parapet and blazing away; often with good results. To determine the range and position of our troops, the insurgents sometimes posted an observer in front of their position and off to one side on a hill, who, with telephone or telegraph instrument, connected with the trenches, signalled our whereabouts.

But all these devices failed to count against the splendid spirit of our men and the lack of confidence of theirs. As our attacking lines approached their fire became wilder and wilder; their men, often afraid to lift their heads above the parapet, fired harmlessly into the air. If the direct attack was combined with a flank attack, as was usual, the insurgents never waited for the flanking force to get in an enfilade fire, but decamped in a hurry.

Their trenches were arranged with great care and skill. As to the extent of their field fortifications it was truly enormous. The whole island of Luzon was covered with them. We often wondered why, knowing from sad experience the uselessness of their trenches, they persevered so assiduously in constructing them. They would spend months in digging trenches for an anticipated attack; when it came, a small force of Americans would rout them from the trenches after a few minutes defense. Thus all their work had gone for nothing. The whole of the seacoast, practically, was entrenched against landing forces, by a trench along the beach. In some places the extent of their trenches was extraordinary, forming defensive works worthy of a good engineer. Notably at San Fernando de la Union, Tagudin and Abra Pass, in the northern provinces, did the trenches excite our admiration. Line after line, tier upon tier, position after position was entrenched. When Chinamen were available, they impressed them to do the work; otherwise they impressed the natives. One feature, however, in these trenches,

was never lost sight of; *a safe line of retreat.* Every trench had connecting with it a runway, by which the retreating soldiers could pass, under good cover, to a thicket, a river bottom, or piece of broken country in which they could run off unobserved. It often happened that our soldiers, having fought their way to within, say, 500 yards of a trench, would see the enemy sneaking off and with a yell would charge them. But all in vain; on arrival at the trenches the insurgents were nowhere to be seen, and the exhaustion of our men made their escape easier.

In their mania for building trenches to provide against all contingencies, the insurgents sometimes overreached themselves, providing trenches too extensive to be occupied by their forces. I saw a case of this kind at San Tomas, Union province, where on the left side of the road parallel to it, was a long parapet facing the sea, to guard against attack from that direction. On the right side, the insurgents constructed a trench commanding the road. Our advance guard, seeing the enemy filing from their barracks into this latter trench, notified the command, which turning to the left gained, the seashore and advancing along under cover of the parapet facing the sea, gained a position less than 100 yards away from the land trenches. Thus our friends, the enemy, were so polite as to give us one trench, while reserving the other; and the forces being equally matched, we had it out there, at 100 yards, in the midst of a terrific fire from both sides, the insurgents finally running away, leaving a tenth of their number dead in the trench, all shot through the head.

The form of trench used by them was adapted to the circumstances. In ground that was well drained, they seemed to prefer the simple ditch, with no parapet; the excavated dirt being scattered, so as to leave no profile. In other cases the excavation was made both in front and in rear of the parapet. But in most cases, owing to the sogginess of the soil, it was necessary to obtain the earth for the parapet, from in front. The parapet was sometimes revetted on both sides, but usually only on the interior side; the material used being bamboo, the basket work being very neat and durable. As a rule grass, weeds, etc., made it difficult to see the parapet from any dis-

tance in front. To command rice plains, the entrenchment was usually placed close to the fringe of trees and bushes that border a river or stream.

Fighting in trenches may be said, from our experience, to be the Filipino's characteristic style of warfare. If our troops keep moving, the individual soldiers, fearful for the safety of their relatives and families, are averse to going any great distance away from their homes. Thus the warfare becomes a series of engagements with local troops, defending their homes. Also, at such times, many of the native soldiers slip away and desert, in order to look out for their families, and the detachments of the enemy are depleted and sometimes disbanded. But the moment the American troops abandon the offensive, the native soldiers fear no longer for their families, and rally about the towns garrisoned by our troops. We thus find opposed to us, not detachments, but armies. It was thus we were besieged in Manila, and in its outlying subports, Calamba, Imus, Angeles, and San Fernando. Whatever may be the policy that dictated the retention of our troops in those places, it could not have been due to the strength of the enemy; for, when in November, 1899, the leash that held our dogs of war was loosed, the resistance of the enemy was broken like a bubble. From that moment (it was probably the case before) a squadron of cavalry or battalion of infantry, could march anywhere in the island, overcoming all opposition.

The secret of safety in the Philippines is movement, continued aggressive movement. The moment our troops sit down, and neglect to scour the country, the opposition begins to organize. Hence the necessity for cavalry and scouts.

The artillery made use of by the insurgents was never worth much. They seemed to have a few breech-loading guns of medium calibre, 3 to 4 inches; and a larger number of smaller size from 1 to 2 inch calibre. Besides these they had a big lot of smooth bore brass cannon. Their artillerists were poor shots, their powder was bad, and their shells failed to explode. The principal use of their artillery was to serve as trophies for the Americans. Our casualties from artillery were few. Owing to the common failures of projectiles to burst, or failing to explode in front of the enemy, artillery is not very effec-

tive against a skirmish line, for such shells, like bullets, can hit no more than one man. When troops are massed it is a different matter.

THE AMERICAN TROOPS.

It may be noted that in the latter part of 1899, and the early months of 1900, an entirely new army was created in the Philippines. It was composed of the Regular regiments, filled with raw recruits, and the volunteer regiments, made up largely of instructed soldiers. The volunteer officers were the pick of the officers of the volunteers raised during the Spanish-American War; the numerous vacancies in the Regular army, on the other hand, had been filled by a lot of youngsters of no experience and no military training. The older officers of the Regular regiments were, most of them, absent, leaving the companies, filled with raw recruits, to be commanded by junior lieutenants. Under these circumstances it speaks well for the Regular regiments, that between the volunteers and Regulars, as regards efficiency, there was not much to choose.

With the exception of the "Immune" and Engineer regiments of the Spanish-American War, these 24 regiments are the only "Volunteer" regiments ever raised since 1799, organized and officered by the United States and not by the individual States. Whoever is responsible for this change from our traditionary policy deserves undying credit, and it is hoped that in future emergencies the success of this experiment will not be forgotten. No such volunteer regiments were ever before seen. Stalwart picked men, magnificent in physique, they looked like a race of giants to the pigmy Filipino. Having received a fairly thorough course of training, in which musketry practice was not forgotten, they embarked for the other end of the world, their only fear, on leaving their native land, being that the war might not last until they arrived. These men have been in many trying situations since; but they have never quailed; they have never surrendered; they have never retreated. One has a superstition against boasting; but it is impossible for one who has seen what they have done not to feel a confidence, a pride in the American soldier that places

him above any of his contemporaries. At Vigan the writer saw 16 soldiers, in obedience to orders, coolly hold a position for three hours 35 yards in front of 200 rifles, never desisting, though they had an easy retreat, until the fight was over, when six arose from the position they had been told to hold, leaving on the ground 7 dead and 2 wounded. The country, anglicised, has ceased to care about the Filipino war; the correspondents, loath to endure hardship, are tired of following our columns; but the history of our campaigns is full of deeds such as these, worthy of the great people whose servants these splendid soldiers are. The monotony of their success seems to have destroyed interest in their achievements; nevertheless the annals of Indian fighting contain few episodes of achievement in the face of obstacles, of splendid fortitude, as compared with those that have been compressed into a few months in these far-off islands.

EQUIPMENT OF OUR TROOPS: CLOTHING.

The clothing issued our troops was with few exceptions adapted to their work. The khaki suit and campaign hat were especially good. The color goes far towards making the soldiers invisible at long distances. In the trenches before Manila it was noticed that picket firing by the enemy often ceased when our soldiers put on their khaki blouses, and recommenced as soon as a few soldiers took them off and appeared in the blue shirt. The blue shirt is a useful garment, but the shirt would be better if it were dyed a neutral color like khaki. In very hot weather the men cannot wear the blouse over the shirt. The shoes might be improved. The ideal type of shoe for field service is what is termed a "hunting shoe," such as are sold in stores devoted to sportsmen's goods; made of heavy thick cowhide, tan color. Such a shoe, properly made, will cost from 5 to 7 dollars; but it is worth it; it would outlast four of the $2 issue shoes. It keeps out water, cannot be pierced by rocks, is strongly sewed, and has a sole that will last. Too much attention seems to be paid to cheapness in the soldier's foot-gear. It may be said the pursuit of Aguinaldo was brought to a stop by poor shoes, at the time when he crossed over the

mountains from Lepanto into the province of Bontoc, the foot-gear of our soldiers was in such a condition that they were in no shape to follow him. It was often noticed that while the men's shoes were worn out, the officers' shoes, built on the hunting shoe plan, were as good as ever.

For field service in the Philippines, a lighter blanket than the present 5 lb. blanket should be issued. On the march many of our men cut the blanket into halves, throwing away one-half; others discarded the blanket altogether, but carried the shelter tent and poncho; others carried only the poncho. It is absolutely necessary that our soldiers here should march light. In the Philippines it is always possible to obtain shelter for the soldiers in empty houses; so that the shelter tent, unless used in lieu of a blanket, is not necessary. It would seem that a poncho, made of the woollen material employed in making "mackintoshes" would make an ideal blanket for a "hike."

The Krag-Jorgensen rifle, and its ammunition, have commended themselves by the test of service. The improved rifle seldom gets out of order. If the edge of the bayonet were sharpened it would be a most useful tool in these islands where in cutting bamboo and light sticks an axe is seldom needed. Being dull the men were inclined to consider it as a nuisance, until, later in the campaign, they encountered the newly organized "Bolo" men, when it became often necessary, on the march, especially at night, to keep the bayonets fixed.

TRANSPORTATION.

Up to August, 1899, it seems to have been the intention to depend for transportation entirely upon the resources of the country; at that date and for some time after, it was reported that the total number of wagons did not equal the field allowance of a brigade. Of pack-mules there seemed to be none. Shift was make to supply companies stationed at outlying points, by native water transportation, by the railroad, and by such wagons as were available. Each company had four Chinese bearers, and for extended marches, the troops were supposed to depend on these, and on bull-carts. But when in

November the troops of Lawton's Division, under General Young, started on the march to head off Aguinaldo, which eventually brought them to the north end of the island, 260 miles away, it was found, after a few days of useless struggle with the muddy roads that the train of bull-carts must be abandoned. Not having any pack-mules, the command lived on the country, and found chickens and rice with a little coffee, an excellent "emergency ration."

Since then numerous wagon trains and pack trains have been added to the army. But there is a kind of transportation in which we are still deplorably deficient, namely, light draft river steamboats, such as are used on the tributaries of the Mississippi. Tugs and launches, we have plenty of, but they draw too much water, since they depend on screw propellers. Stern-wheel steamboats, not drawing more than a foot and a half of water, are still needed; with them we can supply detachments now out of the reach of steam launches, and which, during the wet season, cannot be regularly supplied by wagon transportation. The extension of the Manila-Dagupan railroad, from the north to the south end of the island, is another measure which commends itself to our consideration, from a military as well as an economical point of view.

While our wagon trains and pack-mules give us an advantage over the natives in the matter of transportation, there is one very effective means of conveying troops and supplies which we lack and they do not, particularly in the rainy season, canoes. During the floods their dugouts or bancos penetrate everywhere except into the hills; the merest ditch suffices to float them. The numerous canals, joining the different streams, intersecting the country, are thus an aid to their movement and an embarrassment to ours. At Aliaga, Nov. 2, the insurgents brought up cannon in bancos and shelled the town; but being separated from us by three or more deep rivers and canals, and out of effective rifle range it was impossible for us to make a counter attack.

TACTICS.

Up to the time when Aguinaldo fled north from Tarlac, we

were opposed by an army; since then, as intimated before, we have had only detachments to overcome. The first period saw combats of regiments, brigades, sometimes divisions; during the second period there have been but few fights where more than a battalion was employed. Such notes as I have made belong rather to the era of small engagements.

Owing to our lack of scouts and the difficulty of employing them effectively, even if we had them, it was usually difficult to ascertain the true position of the enemy before the combat; hence the commencement of a fight was often a surprise, the advance guard, being suddenly fired upon, taking up the best position available under the circumstances. The enemy was usually found intrenched across the line of march, rather than parallel to it, this being due principally to their dread of our flanking them. Their rôle was almost invariably the passive-defensive, hence our dispositions. A reserve was seldom regarded as necessary, all the force being put into action. Nor were company supports made use of. If our column was strung out along the road, this was, in a flat and open country, rather to our advantage; the rear companies not being under fire could move unharmed by the flank to a position opposite their place on the line, and then deploy and move forward without confusion. At the first capture of San Mateo, August 12, the position of the trenches of the enemy was approximately known; the advance being over an open rice field, the companies preserved intervals of 50 to 100 yards in the column, thus doubling its length. As was intended, when the head of the column was fired upon, the rear companies were at such a distance as to be out of range. As previously instructed, they moved to the right, deployed forward, maintaining considerable intervals from the companies that preceded them on the line; the last company, designated as the flanking party, increased this interval to 400 yards, which brought it on ground whence they poured an oblique and later a flank fire on the enemy's trenches.

For the same reason, that no offensive return was to be expected from the enemy, a continuous line was usually considered not necessary—at the distances at which modern actions are fought, small gaps in the line are no longer dangerous. The troops had been drilled to deploy with intervals of two yards,

and this they did on the battle-field, but it was evident that the extension of this interval to five yards or more would have had certain advantages, among which were greater freedom from casualties and a longer line and better opportunity to envelop the enemy's position. Its disadvantages would be: more difficult fire control and fire discipline, and a delay in the completion of the deployment; but it is believed the advantages enumerated outweigh the disadvantages.

The methods of deploying laid down in the drill regulations were not always found applicable here. The tendency was, when under fire, or within rifle range of the trenches, to deploy at once into line of skirmishers, and not, as the drill regulations require; first into line of sections or squads, and then into line of skirmishers. It is very easy to see the necessity for this; as long as the men are in line of squads, the enemy has a well defined mark to shoot at; also the men being in double rank and close together, the percentage of casualties is greater. But singularly enough, the drill regulations do not permit of forming line of skirmishers directly from column of fours; hence, if a column of fours, twos, or files was suddenly fired on from the front, the captain was under the necessity of either losing his men or disobeying the drill regulations, which latter horn of the dilemma he adopted by giving the command "as skirmishers, march," the men rushing (not marching at quick time or double time) up to the line on either side of the column. Or the captain would give the command, "right front into line, as skirmishers, march."

Neither was firing by squad indulged in to any extent. The tendency was to keep an officer in direct control of the fire. This, the writer thinks, is as it should be, the German exaltation of the non-commissioned officer, to the contrary notwithstanding. It is well to have the "squad leader," otherwise the N. C. officer posted in rear of the squad, at hand to watch and instruct his men, as a *file closer;* but to have him as a *commander*, is a mistake. The squads, otherwise called fours, can deploy without his assistance; they can move forward, or to the rear, or by the flank without his assistance either as a commander or leader. The whole theory of the squad, and of the deployment based on the squad, of the use of the squad to

attempt to raise the standard of the corporal (for that is what it all amounts to) is wrong. It is as easy to manœuvre in line of skirmishers as in line of squads, and it presents less of a mark for the enemy; the men then, from column or line, should deploy at once into line of skirmishers, finding themselves there, not under the command of corporals, but under the command of officers. And it is a mistake to think that a platoon or company presents too long a line to preserve fire control; the individual soldier will obey more exactly the commands of an officer than of a N. C. officer; and thus the volley firing of many squads under different commanders, is more liable to degenerate into file firing than is the volley firing of a platoon or company.

And here, if digression be permitted, it may be as well to remark that a system that gives to corporals, administration in quarters, and command on the battle-field may be exactly suited to a nation like Germany and entirely unsuitable to a country like America. No greater gulf exists between the enlisted man and officer in the German army than in ours; no greater obedience to the will of the officer; but the democratic spirit of our institutions decrees that the company of enlisted men shall be off duty, a sort of social club, each company by itself, in which the value attached to opinions of men or non-commissioned officers, when off duty, depends upon the character of the man, not his rank. It is sad that this should be so, but it undoubtedly is. And so while the men pride themselves on carrying out, to the letter, the orders of their officers, in a tight scrape, as under a hot fire on the battle-field, we cannot expect such unquestioning obedience to the commands of their non-commissioned officers (acting *quasi* independently) as is necessary for success.

But the fire control exercised by our officers was remarkable, and reflected great credit on our men. Most officers preferred volley firing to firing at will; and platoon volley firing to company volley firing. The difficulty about volley firing is that the enemy being in trenches, pop up between the volleys, fire, and are down before the next volley is fired. With two or more companies, firing volleys by platoon, this is not so easy however. There are certain men, always, in a company, who

when allowed to fire at will, fire as fast as possible, without taking aim, once in a while getting so rattled as to shoot upwards at a considerable angle. This tendency, as well as that of shooting too rapidly, and of failing to correct the sights, the officer can remedy by volley firing. He also has an opportunity to explain and point out the objective of the fire. But strangely enough there was a tendency, in using controlled fire, to fire too little; and instances have been known, of a whole line ceasing to reply to the enemy's fire, very much as if the command was tired and was taking a rest. For this reason, perhaps, and also for the reason that the entrenched enemy is liable, under a hot fire, to cower in his trenches, without replying, some of our best officers, including General Lawton, believed in keeping up a continuous hot fire without regard to ammunition, and in using individual fire, rather than volleys. The nervousness of officers in regard to the amount of ammunition left for use, would have been much lessened, had our troops been provided with means of supplying ammunition to the firing line. This would have been effected, had our infantry companies been supplied with pack-mules to carry rations and ammunition. This question was a serious one at times. At Calamba a line about to charge some guns had to be recalled because it was found the men were nearly out of ammunition. At Vigan, Dec. 4, some of the men, fighting at short range, expended over 300 rounds apiece in 3 hours.

In this connection it may be said that never was the advantage of previous musketry instruction more clearly shown than in this war. Not only does good marksmanship largely multiply the losses of the enemy and thus hasten his retreat, but the fact of the men being good shots gives the troops confidence. On the other hand, nothing can exceed the hopeless feeling of a commander and of his men when they are conscious that due to poor previous training they are expending their ammunition to no advantage, and that few of the enemy are being hit. The most important attribute of troops in battle is confidence, which is merely another name for *morale;* and the rawest recruits can possess that confidence if they are sure of their shooting. It is believed then that on the battle-field previous musketry training outweighs in importance every other kind of training. It is

easy to keep troops up to the mark, when they believe the losses of the enemy are at least equal to their own. But when after hours of fighting the truth comes home to them with sickening intensity that all their efforts have been in vain, when they feel that instead of hitting the enemy they must have shot over his head, the time has arrived when a forward movement of the enemy must result in unpreventable retreat.

Of all nations in the world the Americans should value good shooting. And yet, it has to be admitted, some of the recent volunteers had little target practice. In one regiment the men's preliminary target practice consisted in the firing of but 15 shots per man. Other regiments, like the 33d, for instance, had a full course, and the result was shown in the superior efficiency of the men.

It has always seemed that the effectiveness of volley firing could be improved by a change in the command. To fire accurately, the soldier after aiming must pull the trigger gradually, so as not to derange the aim of the piece. At the command, "Aim. Fire," the soldier at the word "fire" must jerk his trigger quickly, so as to fire at the same moment with the others; for if he is ahead of them the noise of his piece deranges their aim, and if behind, their discharge deranges his aim. He cannot commence pulling the trigger before the word fire, because he does not know when it is coming. But if the command were altered to "Aim, Squad—fire," with always the same interval between the word "squad" and the word "fire," the soldier could commence pulling the trigger at the word squad, the pieces going off simultaneously as before, but with better results and surer aim. This is not a matter of theory but of observation and test. This change would dispose of the most important objectiont to volley firing, that it is not accurate.

Much has been said of late of the large proportion of officers killed in modern war; and the English to avoid this, have gone to the extreme step of taking off all insignia of rank from their officers, arming them with rifles. This is done under the impression that the reason why so many officers are hit is because the enemy, by means of their different appearance, pick out the officers from the mass of men before them, and concentrate their

fire on them. But it is easy to see that the difference in uniform or in insignia is not what betrays them. Insignia cannot be distinguished at the range at which most modern battles are fought. The reason why the officers are picked out, is because they do not get under cover. The men do, and they being invisible, the officers are often the only visible objects. In fact, the writer has often seen a company in action when the position of the company would be unknown to the enemy, were it not that it was marked by two or more officers, in full view, standing or kneeling.

And yet it is impossible to condemn the officers for this. It is not reckless risk of life; it is almost necessary. First of all, the officer should be able to watch his men. He must see that they raise their sights properly and aim properly. Then he must observe the effect of his fire. He must eagerly scan the position of the enemy in order to ascertain where his fire can best be directed. He must coöperate with the other portions of the line. He must be visible to his commander, in order that orders may be transmitted. Can he do all this lying in a prone position? Further, an officer has, in an action, in his mind, two powerful apprehensions; one, lest he may be shot; the other, lest he may be criticised. And the latter is more real to him than the former. His prestige as an officer will suffer if he burrows in the dirt in rear of his men. It is inevitable, therefore, that officers should present the best mark. Else they cannot be leaders.

If troops are fully officered, the percentage of officers killed will always be high. The proportion of killed to wounded among our troops seemed remarkably high. In some fights there were more killed than wounded. The usual proportion seemed to be one killed to three wounded. The Remington bullet seemed more deadly than the Mauser. In a great many of the Remington cartridges the leaden bullet had a brass case and this produced jagged wounds. It is believed this cartridge was manufactured in Germany.

The amount of ammunition expended by us to each hit made was low, varying from 100 to 300 rounds, according to the range at which the action was fought.

ARTILLERY.

From the nature of the service in the Philippines it was not to be expected that the rôle of artillery would be an important one. In the offensive, the duty of the artillery is to silence and destroy the enemy's artillery, which otherwise would overwhelm our columns with projectiles, making it impossible for them to move up and deploy without loss and confusion. Another use to which the artillery could be put is to bombard the enemy's trenches from a point beyond rifle range. But in the Philippines, the enemy rarely had artillery, and in the second case, what we aimed at usually was to hold the enemy in his trenches as long as possible so that by means of a front and flank attack we could kill or capture as many as possible. Once out of his trenches the enemy usually scattered and got away. On a level plain, artillery cannot assist in the attack of the infantry by firing over the heads of the troops, without great danger to the troops. After the infantry attack begins, therefore, it is seldom it could be used except on the firing line. Here it was out of place, since it presented an unduly large mark to the enemy's riflemen. And it is seldom possible to run a gun up alongside of an advancing line without embarrassing the movement of that line. The gun must keep exactly on the line, in front or in rear of the line, the infantry or the artillery is annoyed by the blast from behind. To keep a gun always on the line when infantry is advancing over rough ground is not easy. Further, it is getting to be admitted that the fire of modern artillery on a thin line of men posted in trenches is not very effective. The effect is not worth the ammunition expended. It is believed artillery should in future be ruled off the firing line of an attacking body of troops.

Neither do machine guns seem to have accomplished much. The gunboats sometimes had an opportunity to use them on the insurgents caught by surprise outside of trenches, at short range. Then they were effective. But the writer has seen trenches bombarded by a perfect storm of navy projectiles, 8-inch shells and quick-firing projectiles, machine guns and small-arms, everything going, on board of three ships, a frightful noise, for half an hour, 100 insurgents being in trenches 600

yards away. Result: the "colored gentlemen" scampered off without a single casualty.

We have even tried on the insurgents the dynamite gun. At Calamba last October the insurgents constructed a trench, 1200 yards in front of an outwork, which they held in the face of artillery and rifle fire. One night we prepared a surprise for them. A Sims' Dudley dynamite gun was carried out to our position. In the morning everyone assembled to see the fun. The dynamite gun was trained on the trench and three shots were fired. The noise was terrific; the mud and dirt flew up like a volcano. The "niggers" all ran away. When they had gotten some distance in rear of their trench they were met by an insurgent officer on horseback. They stopped, and led by him went back to the trench. Another shot was fired by us. Hardly had its noise died away when the whole line of insurrectos got up out of the trench, and standing in front of it each man took off his hat and made us a low bow. After that they took no notice whatever of our new fangled war machine.

CAVALRY.

The success the cavalry has achieved in the islands is in remarkable contrast to the prognostications of failure with which we were deluged. It was said that the "jungles" and rice fields made the country impassable to cavalry; that there was no grass, it would be necessary to feed the horses on leaves of trees, etc.; that cavalry could not be used in the wet season, etc. But it is only fair to say that these reports did not originate with those of our officers who had served in the field.

It was found, in the cavalry, that the horses ate rice with relish; that fodder was always abundant and cheap; that the horses and mules thrived; that the cavalry, though they did most of their fighting dismounted, had an immense advantage over the infantry in that they could perform longer marches, the men arriving fresh and fit for fighting; that the rainy season was in some respects, the best for their active operations; since with their big horses and mules, they could make good time over roads, and pass through rivers, when the depth of the water and mud impeded the ponies and carabaos of the insurgents; thus capturing large quantities of supplies that could

not be hauled away. But not only that; they would arrive at the enemy's trenches about as soon as the enemy's messengers telling of our approach; thus the trenches would be but half manned, and easily taken. As said before, movement, continual movement, is what succeeds in this country; thus the enemy's detachments are not given time to reform or reorganize, and are never certain where, or in what direction, to expect us. This was strikingly shown in our occupation of Cavité province last January; this province was considered the stronghold of the insurgents; in it they possessed fortified positions which had successfully resisted not only the Spanish troops but our own; the cavalry went through it, to use a vulgar expression, "like a dose of salts"; in a week it had been completely occupied without serious resistance.

Owing to the delay in sending horses to the Philippines, part of the 4th Cavalry, the first regiment of that arm which arrived in the Philippines, performed at times duties rarely assigned to horsemen. Among other things, three troops of cavalry were converted into veritable "horse-marines," and under Captains Geogh and McGrath, Lieutenant Batson and other officers, did remarkable work on the Laguna de Bai, a large lake near Manila. Embarked in "cascos," native boats looking like canal boats, towed by a gunboat or launch, these sea-dragoons lived upon the water, from time to time making a descent upon the insurgent towns that bordered the lake, capturing and killing the garrisons. The extent and the thoroughness with which this work was performed was truly remarkable. It is probable that the six troops of this regiment which first arrived in the Philippines have performed as varied and as large an amount of service as any organization there. Some idea of it may be gained from the fact that 1st Lieut. Edward T. Balch, 37th Infantry, was discharged, as a sergeant of the 4th Cavalry, with a total of 42 engagements, fought in the Philippines, to his credit.

NATIVE SCOUTS.

No account of our army in the Philippines would be complete without a reference to the value of native troops, acting in conjunction with our forces. As an example of what can be

done with them we have the Macabebe scouts, a battalion of four companies, originally organized by 1st Lieut. M. A. Batson, 4th Cavalry. These companies are commanded by American officers; the men, without being regularly enlisted, for there was no authority for enlisting them in our army, received from the United States the full ration, with the same amount of pay, nominally, as the American soldier, except that being paid in Mexican currency it really was exactly half what our soldiers receive.

These men proved to be good shots, brave soldiers, and when well led, first-class fighters. They were good at handling canoes or "bancas," and intimately acquainted with the network of streams in the low country lying near their district. In that country much of their patrolling was thus done in boats. They are better marchers than our infantry. In General Young's pursuit of Aguinaldo, they were used much of the time as an advance guard, staying ahead of the cavalry. They are acquainted with the customs of the natives; the probable dispositions of the enemy. Knowing the language of the country, they are able to obtain useful information about his movements, and to detect spies and prowlers.

In America the Indian scout covers the country far in front of a marching column, as a dog ranges a field in front of a sportsman; but it must not be supposed that the Macabebe scout resembles the Indian in this respect. When in a country unknown to him, he sticks pretty close to his officer; he is more like a soldier than a scout. In a fight he must be led. When on the road Batson's column marched in two columns of files, one on either side of the road; when the command halted, each column faced outward from the road if there was any danger of an attack. Batson rode at the head of the command; there was no advance guard in front; on being fired upon they all took up the run to the head of the column, where they formed as ordered, except that an officer was always expected to be present. Under a hot fire they were remarkably steady.

It is believed there is no question that good native scouts can be formed of other tribes than the Macabebes. In Lowe's scouts, part of the force consisted of Tagals, who proved good soldiers as well. The Filipinos are not a unit in their hostility

to us. The enlistment of large numbers of natives is sure to eventually commend itself to our government; it detaches the best soldiers from the enemy and identifies them with our cause; it makes our work lighter, and it would produce the nucleus of the native regiments that must (on account of the great expense of maintaining white troops here) eventually become a large part of our Philippine army. These troops will be reliable enough if we give them good officers, feed and clothe them well, and pay them at the rate of half the American soldier's stipend, a rate of pay which, to an Oriental, should seem enormous.

THE PRESENT SITUATION.

The feeling of these people in regard to our occupation of the Philippines is likely to change. But in the meantime it behooves us to show them we are their masters; we must be active or they will be so. It was unavoidable that our army should be so widely scattered (we occupy nearly 400 posts with our 60,000 men), or that our garrisons should be so small. Notwithstanding the smallness of our garrisons, we must prevent other towns not garrisoned by us, from being occupied by the enemy, and we must break up any forces that may be organized by them. To do this requires moving columns of scouts, cavalry and infantry. For this kind of work, mounted infantry is practically as good as cavalry, if well trained; and we should increase our forces of these, by issuing horses to the companies of each infantry regiment, so as to have a mounted contingent at each post. Each post should also have a body of scouts.

The greatest precautions should be taken to prevent the enemy from obtaining supplies of arms and ammunition. This will certainly not be assured unless the coasts are patrolled more vigorously than at present.

And this leads to the reflection that it would seem to a landsman, that the navy might easily take a greater share in the task of holding these islands. There is no question, that if the 30 or 40 small gunboats now in the possession of the navy out here, were available for use by the United States army the

coasts would be patrolled efficiently, and these boats would also be of service in transporting troops and supplies from point to point; thus reducing the enormous charges of this war. There are many towns that must be garrisoned by troops, which can be reached only by water. In the case of these towns, either the means of transportation of reaching them, namely the gunboats, should be at the service of the army, or else the towns should be turned over to the navy to occupy.

The necessity for economy and efficiency would lead to the conclusion, that the command of the patrolling fleet and of the troops should in these islands be in one. This might be secured by giving the civil governor general large powers.

If this cannot be done it has been suggested that the garrisoning of certain ports, and the policing of certain islands be accomplished by the Marine Corps. There is no reason why this body of troops should not, like the army, be temporarily increased for this purpose. Such garrisons would be in constant communication with each other and with the superior commanders, instead of being like many of the army garrisons, left for weeks or months without communication with the outside world.

But after all the question of our policy in the Philippines is mainly a civil one. If we give the natives prosperity, they will be content, and opposition will cease.

IN WHAT WAY CAN THE NATIONAL GUARD BE MODIFIED SO AS TO MAKE IT AN EFFECTIVE RESERVE TO THE REGULAR ARMY IN BOTH WAR AND PEACE.

By Captain L. D. GREENE, U. S. Army.

THE organization and size of the Regular army are both matters of conjecture when we attempt to consider them as anything but makeshifts. Not a session of Congress is held but bills are introduced looking to a change in one or more ways. At present its size is about sixty-two thousand

men, but in a year and a half, if Congress does not intervene, it will by law return to its ante-bellum size of about twenty-seven thousand. But Congress will intervene. It is impossible to go back to where we were two years ago, commercially, politically, or in a military way. We may expect a permanent military force hereafter of 70,000 to 100,000 men, besides an auxiliary force of natives of the tropics of probably 20,000, officered in the higher grades by men who have earned promotion in the past twenty months. A large portion of our army will be stationed abroad. The Arctic Circle and the Equator, the Occident and the Orient are all claiming protection, which must of necessity be given by professional soldiers. Our late plunge into history as one of the great powers has roused the jealousy of nations that formerly deigned not to give us a second thought. Our commerce is spreading fast, and we must be prepared to hold our own abroad, on sea and land; the problem is no longer one of merely guarding our own gates and suppressing factious members of our own community. It is of the utmost importance that we should be prepared to guard against being taken unawares, and as the policy of our country is averse to large standing armies, we must so care for our citizen soldiery as to make it an effective and reliable body of men, both in character and size.

The question of a suitable reserve depending on the National Government alone, and not bound with ties to any State government, is quite separate from the present one of how to properly utilize the (so called) National Guard. In considering this question it is probably intended to class as National Guard all the uniformed, armed and organized militia of the several States by whatever local title it may be called. It is also assumed that in speaking of the National Guard we mean in its normal condition, as before it was broken up at the outbreak of the Spanish War, to which condition in many States it has not yet returned. For the purpose of this discussion, then, we may accept the report of the Adjutant-General of the Army on the State troops for 1897 as describing the force to be modified.

Modification is to change, and therefore a complete reorganization, a change of number and character of the National

Guard may properly be suggested, so long as its distinctive character as being primarily *State* troops is not destroyed. The diverse laws under which the armed forces of the different States are organized make little attempt to conform in detail to the laws of other States or of the United States, and the first essential that occurs to the military mind, to render this combined body of troops effective to work together, is to induce the different States to conform to a general law covering the organization and administration of their respective troops, and acceptable to the general government. It may be assumed that each State is either satisfied with, or indifferent to, its present militia laws. If the United States desires different laws to conform to a general scheme in which it is to be the beneficiary, it must be prepared to pay for it. Emulation, State pride and public sentiment may be relied on to do much, but when it comes to paying the bill there will be hesitation on the part of the many, and the United States must pay enough to make it an object. The present annual allowance of $400,000 is totally inadequate, though half that sum appropriated to help start and encourage an "infant industry" in the way of making a National Guard —to be allotted where deemed most necessary by the War Department, under such rules and restrictions as might be desirable for the purpose of making an effective guard in States not financially able to assume the burden of first cost alone—would go a long way towards the object to be attained.

Before the disorganization consequent on the Spanish War the organized State troops aggregated about 115,000 men distributed very unequally over the country, both per square mile and in the varying proportions of the number of soldiers to the population of the sections furnishing them. The following table shows for each State its organized National Guard force, and the number of available citizens for military service as estimated by the respective Governors, and are taken from the report on the National Guard for 1897, by the Adjutant-General of the Army. The population noted is that estimated by the State authorities for January 1, 1899, as published by the "World" Almanac for 1899. While these estimates are probably slightly too large, the percentages deduced are close enough to fact for argument and comparison.

TABLE I.

STATE.	Estimated population 1899.	Total available for military service.	P. C.	Organized.		
				Actually 1897 enrolled.	P. M. of available.	P. M. of Pop.
Alabama	1,800,000	167,500	9	2,488	15	1.4
Arkansas	1,500,000	252,000	17	2,020	8	1.3
California	1,408,000	218,000	15	3,909	18	2.7
Colorado	492,000	86,000	17	1,056	12	2.1
Connecticut	875,000	111,000	12	2,739	25	3.1
Delaware	175,000	28,500	16	458	16	2.6
Florida	500,000	71,000	14	1,134	16	2.2
Georgia	2,100,000	268,000	12	4,450	17	2.1
Idaho	190,000	20,500	11	508	24	2.7
Illinois	5,750,000	756,000	13	6,260	8	1.1
Indiana	2,900,000	503,000	17	2,875	5.7	1.0
Iowa	2,185,000	297,000	13	2,470	8	1.13
Kansas	1,390,000	101,500	7	1,463	14	1.0
Kentucky	2,200,000	362,000	16	1,371	3.8	.62
Louisiana	1,250,000	137,000	11	2,693	19	2.1
Maine	700,000	107,000	15	1,345	12.5	1.9
Maryland	1,620,000	151,000	9	1,725	11.0	1.1
Massachusetts	2,774,000	439,000	16	5,154	11.7	1.8
Michigan	2,250,000	263,000	12	2,898	11	1.3
Minnesota	1,800,000	177,000	10	1,894	11	1.1
Mississippi	1,625,000	255,000	16	1,795	7	1.1
Missouri	3,250,000	402,000	12	2,349	6	.7
Montana	250,000	32,000	13	632	20	2.5
Nebraska	1,275,000	103,000	8	1,158	11	.9
Nevada	50,000	6,500	13	368	57	7.3
New Hampshire	402,000	35,000	9	1,305	37	3.2
New Jersey	1,950,000	390,000	20	4,297	11	2.2
New York	7,000,000	814,000	12	13,894	16	2.0
North Carolina	2,000,000	246,500	12	1,537	6	.7
North Dakota	235,000	20,000	9	467	23	2.0
Ohio	4,795,000	656,000	14	6,004	9	1.2
Oregon	480,000	61,000	13	1,428	23	3.0
Pennsylvania	6,025,000	887,000	14	8,521	10	1.4
Rhode Island	420,000	86,000	20	1,315	15	3.1
South Carolina	1,300,000	180,000	14	3,127	17	2.4
South Dakota	400,000	55,500	14	696	13	1.7
Tennessee	2,000,000	181,000	9	1,696	9	.8
Texas	3,400,000	303,000	9	3,023	10	.9
Utah	275,000	35,000	13	580	17	2.1
Vermont	344,000	45,000	13	743	16	2.2
Virginia	1,775,000	367,000	20	2,739	7	1.5
Washington	425,000	88,000	20	737	8	1.7
West Virginia	1,005,000	126,000	12	965	7	.96
Wisconsin	2,138,000	375,000	17	2,711	7	1.3
Wyoming	86,000	8,000	9	356	44	4.1
Arizona	100,000	20,000	20	539	21	5.4
New Mexico	283,000	35,000	12	652	18	2.3
Oklahoma	333,000	50,000	15	547	17	1.6
Dist. of Columbia	280,000	48,000	18	1,271	26	4.5
Totals	77,000,000	10,300,000	Av. 13.3	114,362		1.5

The first thing likely to be noted in this table is the extraordinary difference in percentages of populations in different States reported as available for military service. Kansas and Nebraska claim only 7 per cent. and 8 per cent. respectively of their supposedly sturdy peoples as of suitable sex, age and quality to make soldiers, while Rhode Island, Virginia, New Jersey, Washington and Arizona think that 20 per cent. of their populations, men, women and children, are good enough to make into "food for powder." It will be noticed that the majority of States report the more probable percentages ranging from 12 per cent. to 15 per cent., which is not far from what may be expected; about half the population is female; about three-fifths of the male population are either boys too young or men too old for military service of any kind, and at least one-third the men remaining are physically barred from serving in any capacity. In enlisting for the Spanish War about three-fourths of the men offering themselves were rejected, but that was because so few men—comparatively—were needed. In time of national danger the recruiting officer and surgeon will not look so closely for imperfections.

The last column, showing the number of men per thousand of the population who are members of the respective organized State forces, gives curious results. The State with the smallest population, Nevada, turns out the largest number of men per thousand, viz.: 7.3. Of the States of large populations, say 2,000,000 or more, of which there are fifteen, only two, New York and Georgia, enroll as many as two men per thousand in their National Guards. Public opinion does not regard Kentucky as Quakerish in its aversion to the arts of war, but its people evidently prefer to practice them individually to making a collective effort in their National Guard, which is the smallest in relation to its population of any in the Union, only sixty-two hundredths of a man per thousand, and Missouri, North Carolina and Tennessee do but little better. Evidently States like these present opportunities for missionary work in the military line.

As military service in the State troops is strictly *con amore*, and without hope of gain, the following table showing the population and military forces of the different sections of the coun-

try might be entitled "A table showing the geographical distribution of Military Enthusiasm in the United States."

TABLE II.

	Population.	No. N. G.	Per M. of Pop.
New England, (6 States).....	5,515,000	12,601	2.28
4 Middle States, (N. Y., N. J., Pa., Del.).....	15,150,000	27,160	1.80
7 Eastern Southern, (including West Va.).....	10,300,000	14,707	1.43
Central Northern, (O., Ind., Ill., Mich., Wis.).....	17,833,000	20,748	1.16
Central Southern, (Ky., Tenn., Ala., Miss., La.).....	8,875,000	10,043	1.13
North Western, (Minn., S. D., N. D., Mont.).....	2,685,000	3,689	1.39
Middle West, (Ia., Mo., Neb., Kans., Colo., Wyo.).	5,428,000	6,503	1.20
South West, (Ark., Tex., Ok., N. Mex.).....	5,526,000	5,242	1.13
Inter-Mountain, (Idaho, Utah, Nev., Ariz.).....	615,000	1,995	3.24
Pacific Coast, (Wash., Ore., Calif.).....	2,313,000	6,074	2.62

The desert land of sage brush and alkali west of the Rockies inspires more men (relatively) to turn to military pursuits than any other section. The thinly peopled vast extent of the Pacific Coast comes next, to be followed by thickly populated New England on the Atlantic, while the central Southern States are most indifferent, an indifference that was accentuated last year in more than one instance, even under the spur of impending war when difficulty was encountered in filling the small quotas of volunteers called for in the Spanish War.

A study of these figures fails to offer any reasonable theory as to the conditions that would make any given State likely to organize a high grade National Guard, except that those that do well now would probably do still better with government help, and that those that fail now might be shamed and hired to mend their military ways. It is not desirable that military strength should be sectional; it should be distributed as equally as possible over the Union, and for this reason a maximum limit should be set, based on population. States should

know that they must organize a force of at least a minimum limit in order to participate in the bounty offered by the United States, which might be placed at two (or possibly one and a half) men per thousand of their populations. On the contrary, an undesirable disproportion might be created if there was no superior limit beyond which the United States would not go, which might be properly placed at about four men per thousand; this rate would give New York an army larger than the United States army was before the Spanish War, but Kentucky would have to increase its force almost seven fold to reach its possible limit. The census for 1900 will probably show nearly 80,000,000 people in the United States, and by due encouragement it is quite probable that an average of two and a half men per thousand may be enrolled into a National Guard which would then have an effective force of 200,000 men or more. No reserve could be considered effective of less number than this. There were called into service against Spain 223,000 volunteers, and in case of war with any first-class power a National Guard force of 200,000, scattered as it must be, would be as small as efficiency in strength would admit, for purposes of a first reserve to assist the Regular army while the necessary volunteers were organizing, a detailed plan and scheme for which should be carefully prepared without delay.

The men now in the National Guard of the different States are enlisted with little inquiry as to their physical condition, as was shown when many of them were rejected by the examining surgeons last year when they applied for enlistment in the volunteers. A prime necessity then is a uniform standard of physical excellence, based on the requirements of the recruiting service of the Regular troops; uniform organization, drill and training are also needed to produce a body of homogeneous troops. The standard of excellence varies so much in the different States as now administered, that even the total number of men enrolled would be not only too few, but without ability to act together for any military end.

The appropriation that should be made by the general government must then be enough to encourage all the States to reach a standard of excellence uniform for all the States. The questions of how much money should be expended and by what

rule it should be divided, are matters likely to cause much diversity of opinion, but some points will be admitted by all. No man giving his time to military duties, and liable to be called into either State or United States service should be called on to expend one cent for the privilege of so doing, and at present this is not the case. All fatigue or service uniforms should be furnished by the United States at a fixed allowance in kind per man; all arms, ammunition and equipments and tentage and camp equipage needed for efficient work should also be supplied as may be necessary to give troops as complete training as possible in the duties they would be called on to perform in actual service. To defray the expenses of drill halls, armories, etc., for hire and maintenance of horses for mounted men and officers and for light batteries, and for all the miscellaneous expenses of a military establishment, the general government should contribute a sum based on the actual aggregate number of officers and men in service, to be determined by Inspectors appointed by the War Department, who should render annual reports at a convenient time, fully covering the strength, character and efficiency of the troops in their respective districts, and certifying as to whether or not each organization met the requirements of the general government. The certificate so made should entitle the State to draw, for expenditure for its National Guard, ten dollars per head per annum of the troops reaching the required standard. The United States should require for this a certain amount and character of drill and instruction, which should include marching, castrametation, subsistence, logistics, target practice, etc., looking to the efficient availability for military purposes of all the State troops. In order that uniformity of requirements and instruction may be obtained, the law authorizing the expenditure of public money for this purpose should give a clear outline of what is expected, which should include a formal acceptance of the terms, and passing of a military law by the Legislature of each State and Territory, that would conform to the governmental requirements, before any such State should become entitled to claim the assistance offered.

As it would be unjust to condemn a whole battalion or regiment for the inefficiency of only a part of it, inspectors should

not condemn a larger unit than a company, though all the companies of a regiment might fall short, and so practically—by condemning its parts—a whole regiment might thus be thrown out. As failure to approve by the inspector would cost the State the per capita allowance for that year, the State authorities would have every interest in reorganizing inefficient troops and getting rid of officers responsible therefor.

No officer should be appointed without an examination that would demonstrate the probability of his being competent to perform his duties properly, and no lieutenant should receive his first commission without having had military instruction either in some military school of recognized excellence, or as an officer, or in the ranks for two years.

As the National Guard is in each State a purely State organization, the Governor of such State should appoint his officers, subject to the examinations and service requirements set forth, and the methods of selection, whether by election in their own companies or regiments, or otherwise, should be determined by each State for itself. No captain should, however, be appointed without having served as a lieutenant for a year or two at least, and no one below the grade of captain should be eligible for appointment as a field officer, though the previous service in either case may not have been immediately previous, or in the same regiment, or even State. Service in war or in the Regulars or volunteers should count, in time, for double that in ordinary State service, and previous service of officers under those conditions should be considered as equivalent to service in the next higher grade in the State troops.

When, under the restrictions of law, the President should find it necessary to call out the National Guard or any part of it for United States service, requisition should be made on the Governors most convenient for a certain number of regiments of infantry, squadrons of cavalry, battalions of heavy artillery, or light batteries, as might be needed, and the services of General and General Staff officers should be accepted by name by the President, in his discretion.

Every effort should be made to dignify service in the National Guard, and the higher the standard attained the more such service will be sought by young men whose services are

desirable. As an added incentive the Army Register might contain an appendix giving the names of all officers of the National Guard; such an addition would cost little, and most officers would highly prize the fact of being so recognized as part of the National Military force.

The field practice which should be required for ten days or a fortnight every year should be with Regular troops. Heavy artillery should receive training in the handling of heavy guns at sea-coast fortifications, under Regular officers, and sufficient heavy artillery troops should be organized in the sea-coast States to man all the guns of the permanent fortifications therein.

As all mounted branches of the service in the National Guard are deficient in number and training, special inducements should be offered to encourage organization of cavalry and light artillery, and to that end all mounted organizations should be distributed as nearly as practicable throughout the country in proportion to other troops in the same sections, and for all cavalry and light artillery, and mounted detachments of the Signal Corps so authorized, and for one horse for each mounted officer of other organizations, a bounty of ten dollars for each horse should be counted to the credit of each State.

In organization each branch of the service should conform to the legal organization of corresponding arms in the Regular service. Companies of foot troops and light batteries should be required to present for duty, on an average throughout the year a minimum aggregate of 66, and be permitted to enlist up to 100. Cavalry should have a minimum limit of 50 in a troop, and a maximum of 80, and in time of war provision should be made to leave behind a field officer for the regiment, and a lieutenant for each battalion, with sufficient detail of men for recruiting the companies to their maximum as soon as possible. Regiments of the National Guard should also have their own chaplain, surgeons and a hospital corps squad attached, rendering each command independent of assignments for duty of officers or men of those Staff Corps.

The expense of such an organization would run probably to about five million dollars a year. It will be cheap insurance at that price.

Based on the foregoing considerations the conclusion is drawn that the present State guards may be made an efficient reserve to the Regular army, and become a *National* Guard in fact by the passage of a law by Congress, embodying the following provisions and requirements.

That in order to increase the efficiency of the organized militia or National Guard of the different States and render it an effective reserve to the Regular army, the United States will hereafter provide necessary arms, ammunition, equipment, field service uniform, and camp equipage, and an annual pecuniary contribution to the respective States and Territories to be expended in support of the National Guard, of $10 for each man and horse of organizations conforming to the details of this law, and certified by United States official inspectors. Provided that before becoming operative for any given State, such State or Territory shall first formally accept this proposition by act of their legislatures, and pass suitable laws to reorganize their State troops and embody the following regulations:

1. That officers on accepting their commissions, and non-commissioned officers and privates on enlistment shall subscribe to an oath to perform their military duties faithfully to the State and to the United States when called into the service thereof. A failure to carry out such engagement being punishable under the State military code, or under the Articles of War of the United States, if in the United States service at the time.

2. That in case of invasion, rebellion, insurrection or war declared by or against the United States, or when either of these contingencies is imminent, the President may, by requisition on the Governors of the respective States, call the National Guard, or any portion of it, into the service of the United States. Authority for such call shall first be obtained by Congress if it is in session. If Congress is not in session at the time of the emergency, the President may issue such call without the sanction of Congress, and it shall remain in force not longer than thirty days after the next subsequent meeting of Congress, regular or special. And that during such periods the troops so called shall be subject to all the obligations, and entitled to all the compensations of corresponding Regular troops, from the date they assemble at their respective rendezvous and are reported to the

Adjutant General of the Army by the army officer detailed for the purpose, as ready for service.

3. That all members of the National Guard of whatever grade, shall before enrollment pass the same physical examination as is required in the United States service, the records of which examination to be filed as required by the War Department.

4. That companies of infantry, engineers, light artillery battalions, and troops of cavalry shall have organizations similar to those in United States service, with an average enlisted strength of not less than 66 nor more than 100 men, except that for cavalry the limits shall be 50 and 80 respectively, and that heavy artillery shall be organized and trained the same as infantry, except as otherwise provided.

5. That companies shall be organized into battalions and regiments to conform to the organization of United States Regular troops.

6. That regiments of the National Guard shall have a surgeon (major) and two assistant surgeons (one captain and one first lieutenant) who shall be graduates of reputable medical colleges and who shall be required to pass suitable professional examinations, and each regiment shall also have a hospital steward, two assistant stewards, and a hospital corps squad of from 10 to 16 men, who shall also be subject to prescribed examinations.

7. All officers on appointment or promotion shall be required to pass professional examinations, the general scope of which shall conform to a standard prepared by the War Department.

8. Each regiment shall also have a chaplain who shall be a regular ordained minister of some recognized denomination.

9. Regimental and company officers shall be appointed by the respective governors, with such provision for election of officers of any or all grades as may be determined by each State,—provided that (except for medical officers and chaplains) before being eligible to appointment as lieutenant a man must have served two years as an officer or enlisted man, or have attended a school where he received military instruction for two years under an army officer. That lieutenants of two years' service as commissioned officers shall be eligible to promotion

to captain; that captains of five years' commissioned service shall be eligible to appointment to field officers grades, providing that service in the Regular army or in United States volunteers, or in the National Guard in United States service shall count double time.

10. General and General Staff officers may be selected and appointed by the Governors of the respective States, in proportion to the number of troops in such State, and subject to such qualifications as may be prescribed by the State laws. Such officers may be called into United States service individually when troops of their State are so called.

11. The State shall provide suitable armories and drill sheds for security of public military stores and records, and drill purposes in inclement weather. Each company, troop and battery shall assemble for drill and instruction at least 24 times per year, for at least two hours each time; and provided that battalions shall drill together at least three times, and regiments whenever possible—at such times.

Besides the above drills all State troops shall perform field duty, in regiments or brigades when possible, marching, making and breaking camp, and preparing their own meals of issue-rations with camp appliances, for not less than ten days in each year, with practical instruction in guard and outpost duty and such field manœuvres as may be ordered, if possible, in company with Regular troops ordered out for the purpose. All troops shall be instructed in rifle practice.

12. In States within which are located permanent fortifications one or more battalions may be organized as heavy artillery, armed and drilled as infantry; but in place of field service such troops should be assigned to ten days' service at forts mounting heavy guns, and under instruction of the Regular officers there stationed, in serving such ordnance.

13. Troops, squadrons or regiments of cavalry, battalions or companies of engineers, batteries of field artillery, signal or other special corps, may be specially authorized by the War Department in general proportion to the other troops of a State, or with reference to the preferences of different sections, as may seem best.

14. In order to obtain the benefits of the assistance of the

general government herein offered, it is further provided that the National Guard enrolled and actually serving in any State shall not be less in aggregate of officers and men than two per thousand of the population, nor shall said benefits be extended to a greater number than four per thousand, except that every State, Territory and the District of Columbia, shall be entitled to maintain one thousand men if it so desires, without reference to the limitation of four per thousand of population.

15. The War Department shall detail officers of the Regular army of not less than ten years' commissioned service as inspectors of districts, or of divisions and brigades, whose duties shall be to make such inspections as may be required by the War Department, and render full reports as to organization and efficiency, and compliance with the terms of this act, of the troops of their respective districts, and on the reports of such inspectors shall depend the right of the State to its per capita allowance. Such reports shall be rendered by November of each year.

Inspectors shall report officers who are negligent or incompetent by name. Troops, batteries or companies that fail to come up to the required standard shall be so reported, their shortcomings being specified, and the State shall lose the per capita allowance for the number of men in such organization, for the year.

It is believed that the foregoing general plan would so raise the interest in the citizen soldiery throughout the country that an efficient reserve would be formed, national in its feeling, and available for national defense, or other service, with the Regular army, with which it would be uniform in organization, drill, ideas and equipment. A military force is primarily intended for war, and if the National Guard becomes an efficient reserve to the army in war, it will necessarily be one in peace.

NOTES ON THE SUBJECT OF VACCINATION.

By Capt. A. L. HAINES, Asst. Surgeon U. S. Vols.

ON September 17, 1899, it was officially reported that small-pox existed in the Thirty-First Regiment Infantry, U. S. V., then in camp at Presidio, California, and under orders to embark the next day for the Philippine Islands. This regiment was one of the first ten called into service, and was recruited from Kentucky, Tennessee, Indiana, and Ohio—mostly from Kentucky and Tennessee, and within a radius of one hundred miles of Fort Thomas—the point of mobilization. These men were all inspected by the surgeon and, where there was no evidence of vaccination, past or present, were vaccinated. In all, about five and one-tenth per cent. of the regiment were vaccinated at time of organization. After the appearance of the disease, the regiment was transferred to Angel Island, San Francisco Bay, and went into strict quarantine from September 19th to October 15th. During this time the entire regiment was subjected to a careful and systematic course of vaccination—company by company, and individual by individual, whether he showed evidence of recent or past successful vaccination. Every few days subsequently, officers and men appeared before the surgeon and were carefully inspected, and where there was no evidence of the success of the vaccination, the process was repeated; and, if successful, this fact was carefully noted on the company record. This process of revaccination was repeated in some cases four times, and in some others as many as six and eight times. The records were kept and tabulated by companies and battalion, and gave the name of the officer or soldier, the date of first vaccination, and the date when first showing evidence of the success of same, or, if not successful, when the process was repeated. Those resisting all attempts at vaccination were further examined, and their personal history and that of their parents, with reference to vaccination and small-pox, carefully recorded. In all, some three thousand six hundred separate

vaccinations were made. The statistics of this work are now on file in the Surgeon General's office, in a special report, and form the basis of these notes.

Definition.—In general, the term vaccination means the inoculation of the system, through the epidermis, with the virus of some disease. But as generally and technically used the term has a restricted meaning, and applies only to the introduction of the virus of cow-pox, obtained either directly from the cow or through the medium of an individual or individuals, some one of whom has been so inoculated. The first kind of virus is known as bovine virus, and the second kind as humanized bovine virus.

History of Vaccination.—Vaccination was first practiced by Sir William Jenner in 1791, with bovine virus. He had observed that certain persons who were suffering with a disease, apparently contracted from animals they milked, were not susceptible to small-pox, which at that time was prevalent in England. He connected this immunity from small-pox with this bovine disease; and took some of the virus from one of these animals, and inoculated a number of persons, and then exposed them to small-pox and had his impression confirmed: that such virus had the power to confer immunity from small-pox. This experiment, after violent opposition, led to the adoption of vaccination with cow-pox virus as a prophylactic measure against small-pox. Later on this procedure was somewhat modified by taking the virus directly from the arm of an individual originally so immunized, and introducing it into the arm of the person to be vaccinated. This latter system justly became subject to criticism, when it was shown that many other diseases were thus communicated, and created in the public mind so serious opposition to the entire system of vaccination that all the light of recent teachings has not been able to entirely dissipate. This system of Jenner's was entirely different from that of direct small-pox inoculation that had been practiced at an earlier day. The latter system had been brought from Italy, and was supposed to produce a modified form of the disease from the fact that the subject had been first prepared by a system of diet and hygienic treatment for the reception of the poison. While this plan did in a measure

seem to mitigate the severity of small-pox ; yet many died with this inoculated form, and as the most virulent type of the disease could be contracted from a case so treated, and, as these inoculated cases became the centres for the further spread of the disease, the system became justly unpopular, and was largely abandoned when Jenner brought forth his system of cow-pox inoculation. He claimed that such inoculation produced in many cases equal immunity from small-pox as an attack of the disease itself, and that, when such immunity was not fully established, a modified form of small-pox resulted which was of so mild a type as not to be inimical to life. Eventually his system was adopted.

Methods of Performing Vaccination.—There has been at different times two methods of performing vaccination as stated. *First :* the introduction of the virus obtained from the vesicle of a cow-pock beneath the epidermis of the person to be vaccinated. *Second :* The introduction, in like manner, of the virus obtained from the vesicle or scab of one suffering from vaccinia who was himself vaccinated with cow-pox virus, or who received the virus directly or indirectly through the medium of some other person who was thus inoculated. This latter system of using humanized cow-pox virus is, as already stated, practically abandoned. To-day the only recognized system of vaccination is that performed with the cow-pox virus. There is a change also in minutia of the operation, like there has been in all surgical operations. The cause of the serious complications and the ill results so often seen in the past, in connection with this operation, is now more clearly understood, and is now largely avoided. The procedure is now generally done under the most approved methods of modern aseptic surgery. The vaccination done in this regiment was after aseptic methods. The left arm being chosen by preference, as less likely to interfere with the duty of the soldier. It was carefully cleaned with soap and carbolized water and finally with sterile water, after which a small portion of the arm above the elbow was scarified with a sterile lancet or with sterile needles placed in a needle holder. By preference, the serum of the blood alone was sought, and in this the virus was carefully rubbed and then allowed to dry, after which the arm was given

a final dressing of carbolized gauze or cotton, and specific directions were given each soldier not to touch or remove the dressing, but to report to the surgeon for all redressings. The result was that out of the 3600 or more vaccinations done not a single case of seriously infected wound was seen, and only a few that were mildly so where the directions were not properly carried out.

Kinds of Bovine Virus to be Used, and Methods of Preparation.—In the earlier days of vaccination no care was taken to obtain an aseptic virus beyond the selecting same from what appeared to be a healthy animal. There was no knowledge as to how to obtain such virus, or how to keep it so. The virus as a rule, however, was freshly obtained, and in this respect it had a great advantage over much of that now on the market that is kept beyond its time of vitality, and transported long distances under adverse conditions of temperature. Virus of this character is worthless in that the organisms, if viable, are often feebly so, and produce so questionable results as to be worthless and deceptive. Virus should be fresh, and in order to obtain such where it is needed in large quantities, as it is in the present military service, the Government should own and operate its own vaccine plant. The earlier consideration in the manufacture of bovine virus was to secure a virus that admitted of not only easy application, but one that could also be easily transported. The virus was then placed upon a quill point. Later on, an improvement was made in that the virus was placed upon a sharpened bone point that could be utilized for scarifying the surface as well. The plan was further improved by first sterilizing the points, and placing them in sterilized glass tubes to favor their remaining so. However, this plan was found to be faulty in its asepsis, and in the respect that the virus deteriorated rapidly in the dry state. The next advance was a sterile liquid media for the reception of the virus, and we had, as a result, the aseptic glass capillary tube sealed at both ends. The liquid employed was a glycerine aseptic media, and this is the one generally in use to-day. This tube is taken up and one end broken off, when ready for use, and a rubber bulb fitted on one end, which when compressed thus forces the virus out on the scarified surface. This is a

great improvement on the old method of exhibiting virus. The tube, however, is not an entire success in this respect, that it is hard at times to force the virus out of the tube, and then, too, there is forced into and along with the virus air that is generally far from aseptic. The capillary tube is now improved by the Sternberg bulb tube, which is the capillary tube enlarged into a bulb at one end. When ready for use the end of tube is broken off and the heat of the hand applied to the bulb, causing the air in the bulb to expand, forces the virus out. The outward flow of the virus is hastened by applying gently the heat of a spirit lamp. This is an ideal method of keeping and exhibiting virus in.

What Constitutes a True Vaccination. — All vaccinations when effective exhibit certain constitutional and local symptoms, differing in degree, in different cases. Yet the same in character. These symptoms are not unlike those of small-pox, yet less in degree constitutionally, and more circumscribed in local manifestations. In a typical case of vaccinia there should appear a true pock, exhibiting the stage of papule, vesicle, pustule, crusting or scabbing, and finally ending in a depressed pitted scar called a "pock." These several stages of the development of the local part of the disease are well marked, generally clearly defined from each other, and each stage presenting its own characteristics. Upon the third day after vaccination there should appear a papule, lasting three days, or until the sixth day, when you will have this changed into a vesicle with a slight yellowish margin and umbilicated in form, and this condition, lasting until about the ninth day, when reaching full size it will be changed into a pustule with areola extending about it, and this also continuing to enlarge until the end of the twelfth day, or pustular stage, when the pustule is found to have ruptured, thus forming the scab or crust. This stage will last until the fifteenth or sixteenth day. The crust now commences to change color from a light to a dark brown with a depressed centre and loosened edges. This scab may remain for a day or two longer, when it usually drops off. As the ulcer heals there is seen to be left a deep pitted scar. This is the course of a typical vaccination ulcer. But these stages are not always clearly defined; occasionally there is seen irregu-

lar local manifestations of vaccinia in which the different stages seem to run into each other and are not clearly separated. This may be due to some constitutional preëxisting condition or local complication of the vaccination, such as staphylococcus or streptococcus infection. In a successful vaccination there is always some constitutional disturbance as well, differing in degree in different cases. This constitutional reaction, while not characteristic of this disease alone, *per se*, yet when taken in connection with the local conditions above described, may be so regarded, manifests itself in more or less lymphatic disturbance near site of inoculation, axillary glands enlarged and tender, if inoculation has been in the arm, and those of the groin if vaccination has been in the leg. There is aching of the head, back and loins, and often considerable rise in temperature, with loss of appetite and general malaise. These constitutional symptoms, however, may be of so slight a character as often to be overlooked. In many of the cases under observation in this regiment these symptoms were well marked. An inoculation with cow-pox, to be effective, and to produce that immunity or modification of small-pox desired, must exhibit these symptoms both locally and constitutionally in at least some degree. Now it is possible to produce considerable local reaction from the traumatism, alone of denuding the surface, or from subsequent infection of such wounds, or constitutional complications may greatly increase such local and constitutional reaction; but such conditions are always to be easily differentiated from a true vaccination, as such local conditions never pass through the characteristic stages of a true cow-pox inoculation. A condition of this kind should never be mistaken for a true and successful vaccination, as such result can only tend to give a false sense of security. Frequently did we observe such reaction in cases that we subsequently vaccinated and obtained a true pock-mark. We saw, too, a number of localized reactions where there was simply an elevated papular growth of what appeared to be new tissue and without subsequent umbilication or pustulation, or constitutional disturbance. This condition was observed, too, in some cases where there was evidence of a recent successful vaccination. This condition was not the result of the traumatism of vaccination, nor was the

site of the wound infected with pus or other organism, as there was no subsequent pus formation. This growth of hypertrophied tissue disappeared in a few days by a process of scaling, leaving the site of the wound perfectly level, smooth, and firm from cicatrices or pitting. There was no lymphatic disturbance. This condition was to all appearance an abortive inoculation. The organism was at first successfully planted, but the environment—the cell resistance of the individual—or the presence in the blood of an immunizing agent or the attenuation of the virus was sufficient to prevent the growth and to abort the vaccination, after a few days, without leaving the characteristic mark of a successful vaccination. All such cases should be accepted as successful vaccinations, and as immunizing the individual against small-pox, with caution, and only after further and more persistent efforts have been made to successfully vaccinate.

Dangers and Complications of Vaccination. — Since the abandonment of humanized bovine virus and the preparation of the cow-pox virus, under aseptic methods, and, since the performance of this inoculation and the subsequent care of the wound has been had after the same methods, all complications and dangers have been reduced to the minimum. Whatever risks there may be in it to-day issue largely from carelessness or neglect of the person vaccinated, in that through such means, the wound becomes infected with tetanus, pus and erysipelas organisms. There can be no question but in the earlier days of the use of humanized cow-pox virus, syphilis and cutaneous diseases were thus conveyed. Loomis, in his early report on this subject says, "he had undisputed proof of it." With the use of bovine virus there is little of this danger. While other animal diseases might be thus conveyed, yet, with the manufacture of vaccine virus in the hands of responsible firms who carefully select and test the animals to be used in its manufacture for tuberculosis and other diseases, and who examine all virus put up before it is shipped, and guarantee it to be absolutely aseptic as far as other organisms than those of cow-pox are concerned, and who send it out in aseptic packages absolutely free from danger of contamination until it is ready for use, there can be, therefore, little danger from the lymph

itself. Whatever danger there may be in it to-day, as we have said, can come only from the improper performance of the operation or the careless and indifferent treatment of the wound, subsequent to the operation. As the former is in the hands of the surgeon exclusively, there can be no excuse in these days of modern surgery for doing other than a truly aseptic operation. No surgeon is justified in these days, no matter what the hurry or urgency of the service may be, in doing other than such a vaccination.

We are sorry to say that not all vaccinations were done aseptically in the past. We recall the fact of seeing, no longer than last year, men in service vaccinated without any such precautions, and to have seen one case of tetanus follow such vaccination. But there is equal or even greater danger that such wounds will become infected subsequent to operation if handled carelessly and if not properly protected. Both of these conditions, too, are in the direct control of the surgeon, and may, therefore, be regarded as slight in degree. In service, however, as in private work, the surgeon is not able in all instances to get his directions implicitly carried out, and, occasionally, as a result, are seen infected vaccine wounds. The surgeon's duty is done, however, only after the most explicit orders for non-interference coupled with the greatest protection possible for all such wounds. When such care is taken, very little ill result will follow. Of this entire command of 1200 upon whom some 3600 vaccinations and re-vaccinations were done, few, if any, complications were seen from these or any other causes.

Next in importance to the fact of a complication with or without danger, there is another question growing out of the complication above referred to, and that is the likelihood of rendering the vaccination deceptive and probably abortive, and thus failing to secure the benefit desired. While it is a well-established fact in laboratory experience, that often several different organisms are seen growing in the same media, yet, generally, one species shows more vitality than another, and that the strong appear to inhibit the growth of the weak, and for a time, if at all, it will maintain a feeble existence and finally die.

This is something every bacteriologist has witnessed. There

is every reason for believing the same is true of other organisms growing with that of vaccinia, and, while not admitting of demonstration bacteriologically, it is a well-known clinical fact. Loomis had noted this fact, for he says in his article on vaccinia, "it must be remembered that if any chronic or acute skin disease exists at the time the vaccine vesicle is running its course, the protective power of the vaccination will be altogether destroyed or very greatly modified." Again: "If an erysipelatous inflammation occurs during the course of vaccination it entirely destroys the protective power of the vaccination"; and he further states that "the same is true of pus infections."

Length of Time Required to Show Vaccination.—It is generally set down by most writers that vaccination, if successful, will show positive evidence of vesication in three to six days. This may be true of typical cases, but it was not true of the majority of cases in this regiment. In most instances, there was not the slightest evidence of vesication in that time, and, in a number of instances, when we assumed that such vaccination was not effective and revaccinated the subject, we found later on that we had two and even three successful vaccinations, all exhibiting different stages of development. In many instances seven to nine days were required to elapse before there was a positive evidence of the success of our inoculation.

Nature of Vaccinia.—It is conceded that in the practice of *inoculation* small-pox itself was transferred directly from the person from whom the virus was taken, to the person inoculated and that the disease resulting was small-pox. This was proven, too, clinically from the fact that the most virulent form of variola often resulted when the disease was subsequently contracted from one of these inoculated cases, and that they frequently became centres from which small-pox spread.

This is the law of inoculation—the disease resulting is invariably like the parent from which it is descended. The same is true of cow-pox inoculation—vaccinia, the disease resulting, is undoubtedly cow-pox in the human subject. This is not inconsistent with well-established laws with reference to other animal diseases, tuberculosis, glanders, etc., of animals have been inoculated in the human system, and are, to all appearances the same disease with slight if any changes owing to the

difference in media. The question that next presents itself naturally is the following: Is cow-pox small-pox? If so, then many of the phenomena resulting from the inoculation of cow-pox in the human system with reference to small-pox are explained. Unfortunately the bacteriology of these two diseases sheds no light upon this interesting question. The specific organisms of small-pox and cow-pox have not yet been isolated and identified. Either the organisms are too delicate to be seen, or else our present system of staining and cultivation are too crude to admit of their demonstration. Klein and Copeman discovered and regarded as characteristic small bacilli which they isolated from small-pox lymph, but failed to identify owing to the fact that they refused to grow upon any nutrient media. Their observations are not confirmed by any other investigators. Most of the organisms found and present are the pus organisms. Almost identical observations have been made with reference to cow-pox organisms. Clinically, there are strong reasons for believing these diseases to be identical, but there is no direct proof.

(1) They are interchangable, cow-pox can be engrafted upon man, and small-pox can be transferred by inoculation to the cow. Chauveau and Klein and others have succeeded in inoculating animals with small-pox. They succeeded in producing an attenuated lymph in this manner, which when transferred back to the human system, produced vaccinia, a condition which immuned against small-pox, but which was not infective.

(2) They produced similar local conditions and constitutional manifestations, differing, of course, in degree, but none the less the same. This slight difference should be expected from the difference in media upon which the organisms grow.

(3) They both immune against future exposure from small-pox.

(4) This theory of identity of organisms is not inconsistent with known facts with regard to certain other diseases. Tuberculosis and glanders may be communicated from beast to man, and the organisms are known to be the same in the disease of man as in that of the animal.

(5) Such theory is not inconsistent, as claimed by some

writers, from the fact that the organisms do not possess the same degree of virulence, and that vaccinia is not infective. It is a well-established fact that some organisms become attenuated in virulence as we pass them through different mediæ. And, it has been possible to produce an attenuated virus in the same media itself. This was the basis for the belief and the proven fact that it was possible, by exercising care in the selection of virus from a mild case of small-pox, to obtain an attenuated virus that was devoid of danger, and yet would produce immunity. This was the plan carved out in the system of inoculating for small-pox and the history of inoculation proves that such attenuated virus was obtained. Such facts offer presumptive evidence, but not proof of the identity of these organisms. It is proper to acknowledge that some of the ablest investigators along these lines deny the identity of these two diseases.

Crookshenk, an English bacteriologist and comparative pathologist of merit, and who has given this subject much study, and investigated it thoroughly, does not believe the two diseases to be identical. To say the least, if they are not one and the same disease, they are very closely allied, and there are many reasons, as above, for believing them to be the same. Future bacteriological research, with improvement in methods of technique, staining, and cultivation, which is sure to come, will we believe solve this interesting question in the near future.

Susceptibility and Non-Susceptibility to Vaccination.—Nearly every member of the human race is susceptible to inoculation with cow-pox virus. Nearly every one can be vaccinated unless protected by a previous vaccination, an attack of small-pox or varioloid, or his immediate progenitors have been so protected. Of this entire regiment of 1265 in quarantine, recruited from many sections and every walk in life, only fifty-five (or 4.5 per cent.) as shown by our statistics could not and apparently never had been successfully vaccinated. It is possible too, judging from our experience, that some more of this number might still have been vaccinated after further and more persistent efforts. Of the influences that tend to produce non-susceptibility or immunity of the individual, there are two well defined.

(1) The condition of the individual. (2) The condition of the virus. The condition of individual resistance may again be divided into natural and acquired resistance. By natural resistance is meant that form of immunity that resides inherently in every system and that is part of its definite construction. All human systems are endowed to some extent with this natural resistance to disease organisms. Whether the natural resistance to cow-pox virus is the result of the presence of leucocytes—the wandering cell—the condition of "phagocytosis" so called, or, whether this immunity is brought about by the natural resistance of the normal blood serum alone, are interesting but unsettled questions. Many different theories are propounded to explain this interesting phenomenon of immunity, and we know of no subject in the entire realm of medicine that admits of more interesting speculation, or that offers more alluring inducement to determine a correct solution, than that of this interesting phenomenon of immunity. That such conditions exist is a well recognized fact and is potent, as we believe, to prevent in many instances successful vaccination. This cell resistance doubtless exists in all cases. Sometimes it is easily overcome by the invading organisms, and at other times only after the most persistent efforts, and in some instances not at all. In a number of cases we were able to overcome this cell resistance and to vaccinate successfully only after the fourth and even sixth attempt. We have in mind one authentic case that was successfully vaccinated only after seventeen consecutive weekly attempts. The writer, himself, had a number of unsuccessful vaccinations while in service last year, and two immediately before reaching the detention camp on this island, and four unsuccessful ones after reaching there, but in the fifth attempt a successful result was obtained. What, then, we may suppose in some instances to be a natural or acquired immunity, may in reality, be only the natural cell resistance of the organism against the introduction of this virus and not a true immunity. Many of the vaccinations had in this regiment were obtained as shown by the tabulated report referred to, only after a number of unsuccessful attempts to overcome this cell resistance. Vaccination as a matter of necessity should be repeated a number of times, until this cell resist-

ance is overcome, or one is thus convinced of the non-susceptibility of the individual. The invigorating outdoor life of the soldier under favorable conditions may greatly increase this natural cell resistance, or on the other hand, the enervating effects of its hardships and privations under less favorable conditions may certainly greatly decrease it.

Acquired Immunity in General.—There is another form of immunity, that is also potent in resisting the invasion of disease organisms, that is proven to exist from the fact that a system is often endowed with some power to resist disease, that it did not previously possess, after an attack of disease, for example: A person has an attack of measles and ever afterward he is possessed of some power or influence that prevents his ever contracting it again. This is acquired immunity. This immunity is not always conveyed in the same manner. Sometimes it is power added directly to the system, as in vaccination or antitoxine of diphtheria, and sometimes this power is acquired through others. It may be through his immediate progenitors, or it may be through several generations, as shown in the immunity of a family to certain disease and communities and even an entire people. Like natural immunity, there are many different theories as to what this change in the system is, and how it is brought about. One theory is what is termed the "exhaustive theory," that assumes that by one attack of a disease there is extracted from the system some of the essential elements to the life of the disease organism.

Another theory is that of the "retention theory"—that there is retained in the system after an attack of a disease products of excretion or growth which are inimical to the further development of these organisms in that system.

Another theory is that of the vital resistance or tolerance theory which assumes that as a poison is produced from the organism in a system, that system gradually accustoms itself more and more to that changed condition, just as a system often becomes tolerant of a drug, so that what would be a fatal dose at first is scarcely felt subsequently. This is a plausible theory, for we see it illustrated in many other things. The organism of man itself is enabled to exist under many and diverse conditions of climate and temperature with impunity, any one of

which would seem to be fatal to it at first. The most satisfactory theory to explain some form of this acquired immunity is that of the presence in the blood of a new element, an antitoxine, that neutralizes or acts as an antidote to poison secreted by the disease organisms.

Antitoxine Immunity to Vaccination.—This assumes that there is developed in the blood of an individual, the result of an attack of small-pox or varioloid, or from a previous vaccination in the individual or his immediate progenitors, an element that renders him immune within a given time to any future attack of small pox, or future inoculation of cow-pox. By a process of exclusion, this element has been found, in other forms of immunity, to exist in the blood serum, and another notable fact is that such serum is able in many instances to confer like immunity upon others when injected into the system. That there is such a form of immunity in connection with small-pox and cow-pox and many other diseases, as distinct from cell resistance, or other forms of immunity, is now generally accepted and proven, as such immunity is in many instances absolutely permanent, within a given length of time, and no amount of vaccination or revaccination is sufficient to overcome it, as is often done where immunity is due to cell resistance or other forms of immunity. This theory of an anti-toxine element more satisfactorily explains the phenomenon of permanent resistance to vaccination and small-pox and many other diseases that is seen to exist in many instances than any other. In fact, it may be said to explain some forms of what appear to be natural immunity in many individuals and among numbers of people, from the fact that at some past time the progenitors of the individual or individuals composing a community may have acquired the immunity and transmitted it. This kind of acquired immunity through the agency of previous vaccinations or small-pox was found to exist in our regiment in only a small number of men, 324 or 28 per cent. of the entire regiment; but it is possible that in some of this number this immunity was only apparent, and due to cell resistance, and that it might have been overcome by further efforts. While this form of immunity might not be great, owing to the fact of the decrease of small-pox and the lack of systematic vaccination; yet, we be-

lieve it to be a potent factor in explaining some of the instances of permanent resistance to vaccination and small-pox seen. It is at least one of the factors in securing the result. It has been positively shown that an attack of variola or of varioloid will confer this kind of immunity in the individual in most instances, and often in the progeny for a variable length of time. Jenner years ago discovered that cow-pox inoculation would confer a like immunity in the individual against this disease, but in a less per cent. of cases. Is it unreasonable to suppose, too, that vaccination with cow-pox, which is so similar to small-pox in conferring immunity on the individual, will not confer like immunity on the progeny through this anti-toxine agent? This is believed to be true by many writers upon this subject. A certain number of our regiment—fifty-five—or 4.5 per cent. we were unable to vaccinate after most persistent efforts, and they never had had a successful vaccination, although previous attempts had been made in many instances. On inquiry we failed to elicit the fact that a single one of the number had ever had small-pox or varioloid, or that their parents had ever had the disease, except in two instances. These men were recruited from sections where variola has been endemic for years, and where vaccination is more generally practiced to-day than where the disease is seldom if ever seen.

The Condition of the Organism as a Factor in Immunity.—The changes that take place with an organism itself are doubtless as important as affecting immunity as the changes that take place in the human system, the media of growth. This change is without doubt largely dependent upon the change of media. But that such changes do take place in the organisms as distinct from the changes in the media, is a well recognized fact by all bacteriologists, and this fact has also been observed clinically. Epidemics of the same disease often differ greatly in severity. There are different degrees of virulence among the same organisms. When cultivated artificially, one growth is fatal to a susceptible animal while another growth of the same organism is not fatal. It is the history of most organisms that they gradually lose their virulence. The older a disease to a people as a rule the less severe. This is due, as we have said, to the change in media and the change in the organism

itself. This change in the organism we call attenuation. Organisms are of two classes, virulent and non-virulent. To the former, which always lives at the expense of some other body, which we call its host, we give the name of parasite, and to the latter, which is not destructive to other forms of life, the name of saprophyte. As an organism loses its virulence and becomes "attenuated," it gradually changes its life history from that of a parasite to that of a saprophyte. Many disease germs are gradually undergoing this change. That an organism does become thus attenuated, is a matter of experimental demonstration. Pasteur did it by using a media that had been exposed to atmospheric influences for some time, and then growing the organism in it. Toussant did it by exposing the organisms to a degree of heat just below that required to destroy its vitality. Antiseptic agents added to the media have been employed by General Sternberg. Others have used the blood of immuned animals as a cultivating media. Whenever the media used is the blood of a partially immuned animal, or deleterious chemical substances are added to media, or where other physical conditions of media are unfavorable, there is developed an organism of lessened or attenuated virulence.

Benefits of Vaccination.—(1) The production of absolute immunity from small-pox. (2) The modification or attenuation of the disease. All vaccinations have for their object the above. One attack of small-pox or varioloid does not in all instances prevent a future attack of variola, but it does so in most cases. So we may say, vaccination does not absolutely in all instances prevent a future attack of varioloid or small-pox, even within the prescribed average time of immunity, but it does so in most instances, complete immunity being the rule. But, where this condition is not obtained, the attack is always modified, and is never the virulent type so often seen where no vaccination has been had.

This modified small-pox we call varioloid. This partial immunity and this modified small-pox is far preferable to no immunity and to variola itself. Had vaccination no other value, the fact that it can mitigate the severity of this dread disease would be sufficient to recommend it, and justify the exercise of legal authority for its compulsory practice. Many persons thought-

lessly or ignorantly condemn vaccination upon the ground that is does not, in all cases, absolutely prevent the contraction of small-pox. This is a great mistake! Immunity from small-pox is the rule, and yet, where this is not obtained, the benefit is nearly as great in producing a modified form of the disease, and at the same time rearing a family, a community, a people less susceptible to the dread malady. The American people as a whole, as generation succeeds generation, are becoming more and more immuned against small-pox; and when it does prevail it is less and less virulent. This result has been brought about largely through vaccination. As a result of vaccination, more than other causes, perhaps, there is resulting an attenuated organism to-day, that is gradually losing its virulence and changing its characteristics. In the end, this is a greater benefit than that of immunity, for its benefits are felt by a greater number of people. Vaccination did not prevent the spread of variola in this regiment; but its influence, both from past work and that performed by ourselves, was instrumental in giving us an epidemic that was mild in character and that was devoid of fatalities.

FROM OFFICIAL Reports received from China it is ascertained that two daughters of Atwater and 26 others were murdered at Tauyan, July 9. Clapp and wife and four others were murdered at Taku, July 31. Atwater, wife, two children, and six others were murdered by their escort near Pen Chow Fu, Aug. 15 A. M., in Shan Si province. Same message reports six persons, Dixon and wife, Occuren and wife, single gentleman and single lady as having escaped into the mountains from a mission 30 miles to north of Takuan. They escaped on horseback and possibly may have evaded their pursuers.

CONSIDERING THE FACT that the hospital ship *Maine*, equipped by the Anglo-American committee for service in the South African War has been offered to the British Government for service in China, we rather think it would have been more graceful to have offered it on this occasion to the United States Government. Turn about is fair play, but perhaps the Anglo-American committee has no regard for the soldiers of the United States Army. "Tommy Atkins" is so popular, you know.

IN WHAT WAY CAN THE NATIONAL GUARD BE MODIFIED SO AS TO MAKE IT AN EFFECTIVE RESERVE TO THE REGULAR ARMY IN BOTH WAR AND PEACE.

By General W. B. BEND, N. G. Minnesota.

IN order to maintain its dignity and independence, every nation must have an army, and every maritime nation must have a navy. The size of the army and navy required, depends upon the extent of territory of the nation, the character of its inhabitants, the disposition of neighboring powers, and, to a great extent, upon the size of the army and navy maintained by neighboring powers. On the continent of Europe, where the so-called divine right of kings is recognized, and the people have but a limited voice in the making and execution of the laws, and where there are mutual jealousies and great fears about changes in the balance of power, large standing armies are considered necessary, and immense sums are spent on them. In this country, which is free from entangling alliances and petty jealousies, which pursues its course unaffected by the machinations of scheming European politicians, and concerns itself entirely with its own affairs, save when the cause of humanity compels it to interpose its strong arm on behalf of a suffering people, it has not been thought necessary to permanently call any large number of our citizens from peaceful pursuits, and, as a result, until the breaking out of the war with Spain, our army was limited to about twenty-five thousand men, dependence in emergencies being placed on the National Guard, to arm which the meagre allowance of $200,000 per annum made in 1808 was not increased until 1887, when it was doubled, although the population and needs of the country had multiplied ten times. Until the spring of 1898, the possible usefulness of the National Guard was an unknown quantity. Army officers detailed for duty with the National Guard made yearly reports of its efficiency in drill-room and camp, but those reports did not and could not furnish any data on

which estimates could be made of what the Guard could do in the field, and, more important still, no conclusion could be drawn as to how many of the Guard could be relied upon to respond to a call for service in foreign lands, for as our laws now stand, while the President has the undoubted right to call out the whole or any portion of the National Guard for such time, not exceeding nine months, as he may deem necessary, he cannot under such a call, order the Guard out of the United States. This being the case, the calls made in 1898 were for volunteers, preference being given to National Guard organizations, because, owing to their previous drill and discipline, they were far more available for instant use than green men would be.

The National Guard responded nobly, and State quotas were promptly filled, but at the outset, a serious difficulty was encountered. The Government required regiments of twelve companies of one hundred and six men each, while the National Guard regiments seldom had more than ten companies of sixty to seventy men each. As a consequence, the ranks of companies were filled to the required size by recruits, of whom large numbers offered themselves, and additional companies composed entirely of green men were added to the regiments. Politics here came in, with the usual detriment to efficiency. The appointment of officers for the volunteers being left to the Governors of States, while those officers of the National Guard who volunteered, were, as a general thing, commissioned, some were not, and the men who filled their places, as well as the officers of the additional companies needed, were often selected on account of political pull, and not on account of military knowledge. In consequence of this, many regiments entered the service with large numbers of recruits, and with several officers who were utterly unfit for their positions, and as few States keep on hand any extra supplies of clothing or arms, a great many men were mustered into the United States service without uniforms or even arms.

In addition to this, in some States there is no requirement that the issuance of a commission shall depend on the fitness of the candidate as determined by his examination by a competent board, and the efficiency of the National Guard from those States was correspondingly low.

Owing to the insignificant allowance made by the general government, the National Guard was not supplied with modern arms, and few of the States had any camp equipage, save a few tents, and consequently they could not furnish troops thoroughly prepared to take the field. A delay ensued from this, and these causes, for some time, naturally lessened the value of the volunteers, and necessitated long occupation of camps of instruction, thereby giving apparent justification to the remarks which were current in 1898, that the National Guard was of no more value for actual service than would be an equal number of raw recruits. As a matter of fact, the National Guard was far more effective than would have been an equal number of green organizations, and some of the regiments rendered efficient service on foreign soil, but the Guard suffered from the evils which I have enumerated, and was unable to make the record which its friends expected it to make.

Had the war not ended as suddenly as it did, the National Guard regiments which spent several months in camp in the Southern States, would have shown what the citizen soldiery can do when it is not weighted down by politics, and by a parsimony which does not permit the keeping on hand of adequate military supplies, for the green officers were rapidly acquiring knowledge from their fellows, and arms and clothing were at last furnished to the men.

The weak points in the present National Guard system have been shown to be:

1st. The absence of authority in the President to issue orders to the National Guard direct, or to use it outside of the United States.

2d. The difference existing between the organization of the National Guard and that of the army.

3d. The power of the Governors to appoint officers, allowing politics to interfere with discipline, and the absence in some States of a requirement that candidates for commissions must pass a good examination, or be rejected.

4th. Poor arms, and insufficient clothing and field equipage.

Wisdom must be learned by experience; we have had the experience, and we shall have no one but ourselves to blame if we fail to profit by it. It is generally acknowledged that in

time of peace, the Regular army should number, at least, 70,000 men, some think that 100,000 is nearer the mark, but in either case, we must have a reserve force of 150,000 men, which will at all times be in such a condition that it can be mobilized at short notice. How to secure such a force is the problem before us, and it must be conceded that in the National Guard, properly handled and regulated, the only solution can be found.

In proposing changes in the laws, due regard must be had for the provisions of the Constitution, which apply to the army and the militia. They are as follows:

Article 2. Sec. 2. The President shall be Commander-in-chief of the Army and Navy of the United States and of the militia of the several States when called into the service of the United States.

Article 1. Sec. 8. The Congress shall have power to provide for calling forth the militia to *execute the laws of the Union*, suppress insurrections and repel invasions, and to provide for organizing, arming and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively, the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress.

There are two ways to effect the desired result.

The first is for Congress to enact a law increasing the army to 220,000 or 250,000 men, of whom 70,000 or 100,000 shall constitute the active force, being the present Regular establishment increased to that number, and 150,000 of whom, the present National Guard similarly increased, shall constitute the reserve force, which shall be drilled and disciplined under government direction, and shall be liable to do duty when called into active service by the President. At other times while not being subject to the orders of the Governors of the States in which it is stationed, it not being possible, even if advisable, to place United States troops under the command of civilians, it will respond to calls made by the governors on the President, just as Regular troops do now when necessary, and it will perform generally the duty now done by the National Guard. While this plan is perfectly feasible if a law to authorize it

should be enacted, there are grave doubts that public sentiment would favor such a law. It is difficult to make radical reforms. Progress must be gradual. Ideas which have been cherished for a century cannot be suddenly swept away. The people of this country are opposed to large standing armies, regarding them as a menace to liberty, and the plan here suggested would encounter strenuous opposition on this account, and also on account of the expense entailed on the general government, which would be called upon to pay the entire cost of maintaining the National Guard, instead of an insignificant part of it, as at present. Again, the States have always taken a pride in their National Guard, as shown by the large sums they have expended on it, and they would object to having it taken out of their hands in time of peace. They would also object to be obliged to call on the general government whenever it should be necessary to use the military to preserve order and enforce local laws. Then, too, it is questionable whether the members of the National Guard would be willing to be enrolled in an organization which they would regard as a part of the Regular army. Many of them would fear that they would be called upon to perform a great deal of active service, and that their business interests would suffer thereby, and, as a consequence, the best class of recruits now available for the National Guard, would decline to connect themselves with the reserve. This being the case, the second plan appears to be the only feasible course. It is simple, runs counter to no prejudices, and can be easily carried out. It is as follows:

Let Congress enact a law repealing all existing militia laws and providing:

1st. That the militia of the United States shall be divided into two classes, viz.: the organized militia, to be called the National Guard, and the unorganized militia, to be called the reserve militia.

2d. That the President shall have the right to call out for not exceeding six months, the whole or such portion of the National Guard as he may deem necessary to suppress insurrections, repel invasions and execute the laws, and in addition, when Congress shall pass an act declaring that a state of war exists with a foreign nation, and that the militia shall be used

in carrying on the war, the President shall have power to make the call for any time not exceeding one year, and to use the National Guard within or without the territorial limits of the United States. All calls to be made for organizations as they stand, orders to be issued direct to the Guard and not to the Governors of States, and, while in the service of the United States, officers and men to be subject in every way to army regulations, and to receive the same pay and allowances as the Regular army.

3d. The control of the National Guard in time of peace to be left to the several States as at present, but in order to entitle the States to any aid from the general government, the following conditions must be complied with :

A. The Governor of the State must apply to the Commanding General of the Army for the recognition by the United States of the National Guard of his State, giving a detailed statement of the organization, which must conform to that of the army. The service uniform must be the same as that of the army, except that the State button will be worn, and that State instead of United States insignia on the collars of officers' blouses. The dress uniform will be left to State regulation.

B. On receipt of the application, the Commanding General of the Army shall detail an officer who shall forthwith inspect the National Guard of the State in question, and shall report on its organization and efficiency, and whether it has complied with all the requirements of this act. If the Commanding General of the Army is satisfied that the National Guard of the State is organized in accordance with law, he shall detail an officer for duty with the Guard of the State, and such officer shall, at the end of each calendar year, report to the Commanding General, the number of drills made during the year by each company (which shall not be fewer than forty of, at least, one and one-half-hours each) ; the number of officers and non-commissioned officers schools held (of which there shall be at least six per company) together with the average attendance at drills and schools, the time devoted to instruction in rifle practice, the number of members of each company attending camps of instruction for at least seven days, which camps must be conducted in accordance with Clause " E," the general proficiency

attained, and the condition and character of the arms, equipments, camp equipage, etc.

On receipt of this report, if it shall show that the National Guard of the State has an efficiency of, at least, 70 per cent., the Commanding General of the Army shall give a certificate entitling the State to receive in quartermaster, or other stores, ten dollars each for the average number of men who have done duty during the preceding year, and also for the replacement with arms, equipments and field outfit of the latest model, of any similar articles which are reported as obsolete or worn out, and for the supplying of those which are wholly deficient.

C. No National Guard will be recognized in any State in excess of four hundred men for each member from said State in the National House of Representatives, except that if the number of men reported in any State is smaller than the number to which said State is entitled as above, the deficit may be made up by increasing the number to be recognized in some other State or States. There being, at present, 373 members of the House of Representatives, this will provide for practically 150,000 men. The entire National Guard shall consist of the same proportions of infantry, cavalry and light artillery as does the Regular army, except that there shall be no troops or cavalry in which the men do not own saddle horses, as such organizations are useless. Any shortage that there may be in cavalry or light artillery shall be made up by increasing the infantry arm.

D. After the passage of this act, no one shall be commissioned, whether by promotion or otherwise, as an officer in the National Guard of any State which shall apply for recognition in accordance with Clause "A," unless he shall first pass at least 65 per cent. in an examination of his military knowledge and general fitness, by a board of three officers, two of whom shall be appointed by the Governor of the State from the officers of the National Guard of said State, and the third of whom shall be the officer of the Regular army detailed in accordance with Clause "B."

Subject to the foregoing, all line officers shall be elected by the officers and members of their respective companies, all field officers shall be elected by the field and line officers of their respective regiments, all brigadier-generals shall be elected by the

field officers of their respective brigades, and all major-generals by the general and field officers of their respective divisions. Staff officers shall be appointed by the officers on whose staff they are to serve. All officers shall hold office during good behavior, subject to resignation and to retirement at the age of sixty-four.

This is the only way to keep the selection of officers out of politics. Plans heretofore proposed that all officers in the National Guard above the rank of captain shall be held by officers of the army detailed for that purpose, are merely efforts to make easy positions with increased rank and pay for officers who may have influence in Washington, and such plans, if carried out, would greatly diminish the incentive our young men now have to join the Guard, and would make recruiting more difficult. The plans also conflict with the latter part of Article 1, Sec. 8 of the Constitution, which provides that the States shall have the appointment of officers.

E. Camps of instruction must be conducted according to army regulations, the men pitching and striking tents, doing their cooking, etc., and a practice march must be made during each encampment. Instruction in rifle practice must be given at armories, and rifle practice must take place in camp.

4th. The Government shall, at all times, keep in stock sufficient clothing, arms and equipments to arm and equip 50,000 men. Issues shall be made from stores longest in the arsenal, so that there will be no accumulation of old material.

As it will be necessary to furnish the National Guard with magazine rifles and breech-loading field pieces to replace the antiquated weapons with which it is now armed, the appropriation required to carry out this act the first year, will be about $2,500,000 for arms and equipment, and $1,500,000 for the per capita allowance, or $4,000,000 in all. After the first year $1,000,000 will suffice for arms and equipments, and $1,500,000 for the per capita allowance, or $2,500,000 in all. As the States for several years have been expending nearly three millions per annum (in 1897 the amount was $2,723,564.35), and as the general government ought to pay, at least, as much, the appropriation called for by this bill is not at all unreasonable. There is no question that all the States will apply for the recognition

of their National Guard, as by so doing they will receive material assistance in its maintenance, and if they do not, they will lose their present allowance. States which have given their Guard adequate support, will be relieved of a part of their burden, and States which through poverty, parsimony or indifference, have not done so, will have an incentive to do their duty, and will unquestionably do it. Therefore, the enactment of such a law as is here described will accomplish the following results:

1. The National Guard of every State will be organized on the same basis as the army. It will be under the immediate supervision of the Commanding General of the Army, and it will be increased from 114,000, its present strength, to 150,000. It will be a National Guard in fact as well as in name.

2. The drill and discipline will be the same as that of the army.

3. The National Guard will, at all times, be armed and equipped with the most modern weapons.

4. Incompetent men will not be commissioned as officers.

5. Politics, that bane of all armies, will be eliminated.

6. By basing governmental aid to a State on the number of men who do duty, instead of on the number of its members of Congress, as at present, the attendance at drill and in camp will be increased with the result of having a more efficient force, and by requiring a proficiency of at least 70 per cent., full value for all expenditures will be received by the general government.

7. While during peace the control of the National Guard will, to a great extent, be left with the States as it is now, the President will be able to call it into service whenever and however needed, and will not have to depend upon the caprice of the Governor of any State.

8. The large stock of arms, clothing and equipments kept constantly on hand will supply all deficiencies, and make prompt mobilization possible.

Comment and Criticism.

"HOW TO PUT THE NATIONAL GUARD ON A TRUE MILITARY BASIS."

HEADQUARTERS FIRST BRIGADE, N. G. S. M.
ST. PAUL, MINN., SEPTEMBER 14, 1900.

Editor JOURNAL M. S. I.

WHILE heartily agreeing with most of the ideas expressed by Major Hitchcock in your September number, I must beg to differ with him as to the inadvisability of continuing to elect the officers of the National Guard. If the officers are not to be elected, they will be appointed by the Governors of the several States, and if this is done the appointments will be largely political and bad. An experience of twenty years in this State shows that with the safeguard of an examining board and the requirement of at least 70 per cent. to pass any candidate, we get a superior class of officers who have proved themselves equal to all emergencies, and I am satisfied that no improvement on this plan can be devised.

W. B. BEND.

Translations and Reprints.

THE WAR—THE FUTURE OF OUR ARTILLERY.

By Captain C. HOLMES WILSON, R. F. A.

(*From the United Service Magazine.*)

OUR Field Artillery in South Africa has suffered frequently at the hands of various critics. The problems produced by the war should, however, be carefully considered. Conditions that could only be appreciated by those who were previously acquainted with the country* led to events which at the time were perhaps not unnaturally ascribed to a want of foresight on the part of the home authorities. The Transvaal had been arming since 1896, large sums had been spent, and the best matériel in the market purchased, regardless of expense. Now, curiously enough, it was during this period that the field artillery equipment of Europe was in a transitionary stage. Rearmament had been commenced or accomplished on the continent, consequently, when the Dutch republics sent to European manufacturers for guns, they had their choice of the latest designs. In England, however, the changes that had been effected on the continent were viewed with doubt, and the alterations that cost France and Germany millions were eventually copied in a minor degree in our artillery by the adoption of a slight and inexpensive alteration in the existing field artillery carriage. Our guns, however, which had first been introduced some ten years ago, remained the same. The Boers, on the other hand, were equipped with matériel possessing the latest improvements, improvements that are too often referred to under the mistaken title of "quick-firer." Some of their field-guns had fixed ammunition; those that had not had metal cases for their charges, and the ranges of all appear to have exceeded that of our 15-pounder by several thousands of yards.

* I refer particularly to Natal, where the powers of vision are practically unlimited by atmospheric conditions.

Small as these items may seem at first, their importance was soon proved to be great. It was because of them that the Boers were able to use their guns as they did; it was because of them that single guns could put several shell into a battery at a long range, whether it was stationary or on the move, whilst the batteries very often could not reply. It may be asked how it was that, under these circumstances, the Boers did not do more with their artillery than they did. The Boer guns failed to produce any great impression chiefly because they rarely concentrated their fire for any length of time on any given spot, because their ammunition was bad, and because their guns were inferior in numbers to ours and were afraid to risk a stand-up fight.

The strength of the Boer military resources only became apparent as the war developed. Had the nature of their armament, however, been known during the crisis which immediately preceded the outbreak of hostilities, it would have been impossible to improve our field-guns in the time then available; though some preparations for the provision of more powerful guns might possibly have been made. The policy that had placed the 15-pounder on a par with weapons of modern construction was bound to be adhered to then, and the gun subjected to the practical test of war. There are many who think that the trial has been a success. Undoubtedly the gun fulfilled many of the expectations that had been formed of it. In fact, when the 15-pounders captured by the Boers were turned against our own troops, our men suffered more than they had suffered from any of the Boer guns. This was mainly, in fact solely, due to the quality of the ammunition, which, within certain limits, was undoubtedly most effective. In short, if the gun itself had not been at a disadvantage in other respects it could not have been surpassed. But then the unforeseen occurred, or, rather, the Boers had guns of later design than we had. This, however, does not seem to be the way in which to regard the question. What we want to do is not to stand still, but to go ahead; and this can perhaps be proved by quoting facts.

One of the greatest disadvantages incurred by our artillery in the struggle which has happily ended so successfully, was

their lack of range, when compared with the distance that the Boer guns could shoot. It may be urged that field-guns are not intended to engage siege guns; they, however, frequently failed to reach even the enemy's field-guns, when the latter could reach them; and, in any case, a system which puts an army into the field inadequately equipped with powerful artillery would seem to be faulty somewhere. The field howitzer (5-inch), a powerful weapon, from which much was expected, has a range of only 4900 yards, and frequently failed to be of use on that account. During the engagement at Venter's Spruit, if our howitzers, or even our field-guns, had had a longer range, something might have been done to assist our unfortunate troops on the top of Spion Kop. As it was, we could only look on and wish we had a few guns equal in range to those of the Boers. On the 24th January, the enemy's shell were searching the crest of the now famous hill, whilst some forty British guns were practically forced to look idly on. Then, again, any one who witnessed the demonstration in front of Brakfontein before the attack on Vaal Krantz could not have failed to feel the pitiful position of the six field batteries that participated in that display. Outranged, they had to stand still, to be shot at; and the smallness of their loss was solely due to the bad quality of the enemy's ammunition. Two days later, when the "long Tom" appeared on Doornkloof, the short range of our guns was again the forerunner of ill success. In this case it was the howitzers that were "found wanting." Long Tom was on a high hill. Our heavy guns which could reach him were nearly all on a plateau some hundreds of feet below this hill; "Tom" was in an emplacement, and mounted on a disappearing carriage. Direct fire, even from the high position on Schwartz Kop, was useless against this place, and from the plain below it was worse than useless; the shell struck the mountain, or passed harmlessly over it. What was wanted was a howitzer that could search the hill with high-angle fire. The range was, however, too great for our howitzers, and "long Tom" defied us while we remained there, and followed us up when we retired. This question of range is evidently a most important one. If the field-guns of one force can shoot accurately at 7000 yards, it is clear that they will outclass those of

their opponents which may only be able to fire up to 5500 yards. This, however, is practically what has happened. The question is: How is the range of our field-gun to be increased and its mobility maintained—if great mobility is still regarded as an absolute necessity? Whether both these requisites can be combined in one design is really a problem for the manufacturers to decide. It would be well, however, to note that the Boers appear to have managed it, and that the 12-pounder guns of the Naval Brigade, when mounted on the temporary carriages constructed by Captain Scott, and hooked on to the limbers specially provided for them, did not weigh approximately more than about 25 cwt., as compared with the 36 cwt. of our present field artillery equipment. These guns—the naval 12-pounders—however, are sighted up to 8000 yards, and can fire considerably farther when clinometer elevation is used.

The question of range, however, affects the other arms as well as the artillery itself. Infantry come under shell fire earlier, and a few well-posted guns can now sweep the whole front of an ordinary defensive position. The artillery can also be put farther back if necessary; and this is a most important point, in view of recent developments in rifle fire. Field artillery, have, so far, been taught that they should push to the front at an early stage of the engagement. As the range of the rifle has increased, this has, however, become less feasible than of old, if not altogether impossible. The consequence is that with short-range guns, batteries have had to advance in rear of the infantry. The pace of the infantry has, in fact, become that of the artillery. Consequently, if it is not possible to increase the range of our field-gun and still maintain its mobility, it becomes a question of whether the value at present attached to mobility ought not to be modified in view of the altered circumstances under which we may have to fight in the future. If a long-range field-gun cannot be introduced unless it is mounted on a heavy and cumbersome carriage, it may just as well give place at once to a position gun, such as the naval 4.7-inch, and allow the mobile work to be done by the horse artillery or a somewhat similarly organized mounted corps. A heavy gun like the 4.7-inch can keep pace with infantry, and is much more powerful than any ordinary field piece.

Then, the extensive use of earthworks in South Africa has raised another artillery problem. Though the use of earthworks in modern war has been generally anticipated, few, if any, practical experiments have ever been carried out at home by field batteries against targets under cover. The result has been, that the discovery that field-guns are of little use against troops under cover was left to be proved by actual war, with the inevitable result that an undue amount of reliance was often placed on the artillery in cases in which it was destined only to lead to disappointment. All that field artillery can do against men in earthworks is to keep them there by a constant storm of shell. Searching the trenches is the special work of howitzers. Unfortunately, however, the range of our 5-inch howitzer is too short to permit of this always being possible. It is doubtful whether trenches such as the Boers had can be seriously knocked about by the direct fire of even heavy guns. In any case, if anything is to be done by direct fire, it is only likely to be accomplished by the use of a heavy shell and a powerful gun. On the other hand, against troops in the open a storm of light shells would probably be more effective than the occasional discharge of a few slightly larger projectiles. The value of what may be termed a medium matériel consequently seems doubtful. I do not advocate the abolition of the field artillery, but suggest that one really mobile force, armed with a long-range, rapid-firing gun, firing a light shell, and supported by a semi-mobile force armed with a powerful gun or heavy howitzer of long range, would fulfill the conditions of modern war more fully—as exemplified in South Africa—than any medium mobile equipment could possibly do. The evident value of mounted troops, as shown by Lord Roberts' campaign, proves the necessity of possessing a large force of mobile artillery; and the fact that our field batteries are at present too heavy to act continually as horse artillery seems to strengthen the case in favor of the suggested procedure. Apart from the necessity for rearmament, such a step would not involve many radical or expensive changes.

There are a few technical questions connected with the so-called Q. F. guns that require further explanation. Rapidity of fire can be secured in a field-gun by more means than one.

That to which the greatest efforts of manufacturers have been directed of late has been the recoil. If the recoil could be checked, a quick-firing field-gun could be produced. At present different devices are employed with varying success, but none have as yet led to a rigid mounting been obtained. Besides the carriage there are, however, other points connected with the gun that tend to increase the rapidity of its fire and necessitate attention. If a gun is to fire quickly there are two important factors that must be provided for in the gun itself. It must (1) be rapidly laid and (2) easily fired. Our 15-pounder carriage, like the carriages of most modern field artillery, has been fitted with a contrivance to check the recoil; the gun, however, has not been touched, and, consequently, loses proportionately in rapidity of fire and power. As regards (1) improved sights* are believed to be under consideration now. As far as (2) is concerned there appears to have been a strong objection brought forward by some experts against the employment of metal cases for the charges of our field-guns. When a metal case is used the gun can be fired by a percussion lock. At present three distinct motions have to be performed before the charge can be ignited, which all tend to cause delay. Now, the Boer field artillery used these metal cases, and in some cases their ammunition was fixed, that is, the charge in a metal cylinder was attached to the base of the shell. The result of the employment of these modern improvements was frequently self-evident: the guns could fire several shells in rapid succession; they could follow up moving targets, and could be employed separately. These were all important advantages. The nature of the ground could be made use of according to the circumstances of each case. By employing single guns cover could be utilized to the full, and the positions of the different pieces made very difficult to see. At Brakfontein, on the 5th February, three Boer guns maintained a constant fire on six field batteries—the latter being unable to reply on account of the length of the range. A British battery of six guns could scarcely have produced such a storm of shell by using its most rapid rate of fire. Then, later on in the same day, our system of fire discipline and slow

*The present sight of the 15-pounder field-gun has to be removed before the gun is fired. This operation causes delay.

rates of fire led to the escape of a Boer gun, and the advance of a pom-pom, without a shot being fired at them from the field guns. Opportunities occur rapidly, and, if they are to be made use of, admit of no delay. If two or three officers have to be referred to, and the battery slowly ranged, the moment for striking passes, never to return. Where such rapidity is required, sections or single guns should be given some scope. When the Boers followed up parties of our men or batteries on the move, with either their field-guns or pom-poms, they cannot have been wedged in by restrictions and surrounded by fixed rules.

If we could secure a rapid-firing gun and a smaller unit (four guns) many of these difficulties would disappear. To any one who has watched a brigade division of three six-gun batteries defile into position the unwieldiness of the mass is self-evident. Then the target* afforded by such a body is one that it would be hard to miss. By the employment of four rapid-firing guns in each battery the same amount of fire could be obtained, a moving object quickly engaged, cover more easily secured, the target offered to the enemy decreased, and the battery kept more in hand.

The drawbacks enumerated should not be hard to overcome if fairly faced. The armament of the field artillery will sooner or later have to be changed, if the artillery is to hold its own in the future. The nature of the new armament may partly depend upon the results of the present war. In considering them it would be well to bear in mind the part that has been played by mounted troops and mobile batteries on the one hand, and powerful guns and strong positions on the other. The result at present seems to point to two arms in the future: a mobile artillery, and a powerfully equipped position artillery. The points to be decided seem to be, Is there scope in an ordinary war for two mounted branches, horse and field, and to whom are the position guns to be given? As regards the mobile branch, we ought to remember that the great power of modern rifle-fire tends to increase the strength of defensive positions and adds to the importance of mounted troops, that can turn them by mov-

* Major Albrecht, of the Free State Artillery, has been reported to have alluded to the large target afforded by batteries, particularly by the horses. Good cover for the latter was generally scarce.

ing to a flank. It is not too much, consequently, to anticipate an increase in the strength of our mounted infantry. Such an increase would necessitate the provision of a proportionate amount of mobile artillery. The field artillery could scarcely rise to this rôle for any length of time with their present equipment. Neither could they do much against defensive positions; and if compelled to walk with infantry—the only apparent alternative left to them—their place would be better filled by powerful position guns or howitzers. It may be urged that field batteries could not be dispensed with, as sudden changes in a tactical situation might suddenly demand the presence of guns at the threatened spot. Could not this part, however, be played by the mobile arm, with the lighter gun—always taking it for granted that the lighter gun was a rapid firing one? Would there, for instance, be any great difference in the moral or material effect of a storm of, say, 10-pound shells and the slower hail of 15-pound projectiles? Against troops in the open, such as a sudden change in the tactical situation would infer, the rapid fire and smaller shell would probably have more effect than the more systematic discharge of the heavier projectile. For instance, take the rapid fire of the Boer "pom-pom." Its moral effect was great, though the shells were small, and it could follow up troops on the move with ease. But to return to the comparison between the two classes of matériel. If the difference between the two against troops in the open would be small, what would it be against troops in trenches? There would then be none, as each would be equally ineffective: all either could do would be to keep the enemy behind his cover.

In regard to the heavy artillery—a considerable proportion of which should undoubtedly be long-range howitzers—it must be remembered that the class of gun to be employed in any particular campaign largely depends upon the nature of the country and the description of transport available. On the Indian frontier, for instance, as nothing but pack transport can be used, mountain artillery can, of necessity, alone be employed. In South Africa, however, where heavy guns can be moved with comparative ease in even hilly districts by teams of oxen, mountain artillery was not required. Heavy guns were put in position on the high hills about the Tugela, and the necessity

for the presence of mountain artillery was consequently never felt. In regard to the use of heavy position artillery at home, some difficulties may be met with in the weight of the matériel and the means of its transport. As the movements of such an arm will be carried out at a walk, there is no apparent cause for too much anxiety in regard to this. If, however, such objections should prove well founded, why should not oxen be used? Their employment would perhaps be an innovation in England, but surely not an impossible one?

A question may be raised as to whom these guns should be given—Regulars, militia, or volunteers. If to the former, another increase in the army would be necessary; if to the militia, their existing organization would have to be changed; and if to the volunteers, more money would have to be provided by the War Office than is at present the case. The volunteer force, is however, the only one that has ever had position batteries so far. The volunteers have labored under difficulties to make their corps efficient; they have gone to great expense to train their men; they have themselves provided the money that the authorities refused to supply. Under these circumstances, when a change for the better is contemplated, when out-of-date muzzle-loaders are to be replaced by up-to-date matériel, it would be unfair to pass over the claims of the volunteers. Of course this is presuming that regular position batteries are not to be formed; under these conditions the volunteers would appear to have a prior claim to the militia in this respect. But if the volunteers are to be rearmed they will require an extra grant of money and some more training; otherwise, they could never be taught their duties properly. To do this, some arrangements would have to be made by which they could be taught their mounted drills, as horses would presumably be employed at home or in other European countries in case of war. Under existing arrangements, however, mounted drill with them is practically an impossibility, unless the officers pay for it. A scheme to provide for this extra training would consequently have to be devised. If the volunteers could spare the time, a central school might be established, and horses for the batteries kept there. In this respect the militia would have an advantage over the volunteers, on account of the length of their train-

ing and of their preliminary drills. It might, however, be possible to place horses at central places near the towns from which position batteries are supplied. The various position corps nearly all come from the northern or midland counties, only two being quartered in the south, viz., one at Worcester and one at Woolwich. If horses could be placed at a central depot within reach by rail of the required towns, training and instruction might be systematically carried on throughout the year. For example, the 4th West Yorkshire Artillery have a few horses of their own, and on these the men are taught to ride. If horses to equip a corps could be provided, either at a central depot or in fewer numbers among the different corps themselves, riding drill could be taught in the winter, and driving and other drills in the longer summer days. An efficient force might thus be secured, quite capable of doing what our heavy guns have done during the war in South Africa.

SERGEANT SANS-SOUCY'S CAPITULATION.

A MILITARY INCIDENT IN THE REIGN OF LOUIS XV—1746.

By Captain S. PASFIELD OLIVER, late Royal Artillery.

(*From the United Service Magazine.*)

IT appears that Martin Aubry was born at Sommevilie, a small village in Lorraine, about 1721. Indeed, M. Henry Houssaye, the precise Academician, who tells us the story, goes so far as to name the actual day on which Martin was brought into the world, and says it was the 6th of September; but, anyhow, it was during the regency of the Duke of Orleans, and before Louis XV. had married Marie Leczinska. We are not told who Martin's parents were—probably mere peasants working in the vineyards of the Moselle district Cardinal de Fleury, in spite of his love of peace, was forced to engage in two wars in aid of King Stanislas Leczinski, the father-in-law of the young king; and possibly the accounts which reached the villagers of Sommeville of the French victories in Italy, at Parma and Gastella, inspired the martial ardor of the young Aubry. Be that as it may, at all events, at the age of sixteen

years, that is, as soon as he possibly could, the young peasant tramped into the town of Nancy and enlisted in the Regiment of Tournai,* a crack regiment among other fine regiments of his majesty, the King of France. Indeed, the Tournaisis regiment, since its creation by Louis XIV., in the year before the famous revocation of the Edict of Nantes, had taken a leading share in all the campaigns. It had particularly distinguished itself in the defense of Cremona and Toulon; whilst it had also fought well during the war of the Spanish Succession, and lost heavily in the battles of Malplaquet † and Denain‡. Its standard consisted of alternate red and yellow bands which divided in four squares the large white cross. The uniform of the regiment, which had especially attracted Martin's fancy, was certainly among the handsomest in the whole French army of the eighteenth century. The soldiers wore white breeches, white coat with red facings and scarlet waistcoat with long lappets; and on their heads profusely powdered, with queue, was a three-cornered hat richly laced with gold. The female portion of the inhabitants of Nancy and other towns of Lorraine regarded favorably the march past of the Tournaisis, and the ladies always declared that they were decidedly "pretty men"—"*qu'ils avaient bonne grâce et l'air de guerre.*" On entering the regiment, according to the custom among soldiers of that time, Martin Aubry changed his name, and took a *nom-de-guerre.* He had the choice of various names which sounded well—several of which have come down to us, as then in vogue, such as "Sans-Quartier," "Va-de-Bon-Cœur," "Beau Visage," or "Brin d'Amour," "La Tulipe" or "La Pervenche." Martin, however, chose the name "Sans-Soucy," and it is well remembered throughout Lorraine to this day.

It thus came to pass that Private Sans-Soucy entered his regiment in the year 1737, and speedily became a favorite among his comrades and the veterans, on account of his good nature and ready wit, which well accorded with his assumed nickname. It is impossible to follow all Aubry's doings during

* Regiment of Tournai in Hainault, now in Belgium.

† Malplaquet, when General Villars was defeated, September, 1709.

‡ Denain, the victory of Villars, in 1712, which delivered the North of France from the Imperial armies.

the war of the Austrian Succession, when France was assisting Prussia to obtain the Austrian provinces. It is evident that he did well, as we hear that he was promoted to be corporal in 1741, after fighting in Bohemia; and he became sergeant in the following year, when the Austrian troops of Queen Maria-Theresa were attacking the frontiers of Alsace and Lorraine. In the olden days, it was rare for a non-commissioned officer to obtain the halberd of a sergeant with less than ten or twelve years' service. Sergeant Sans-Soucy had attained his halberd in less than half that time.

In May, 1745, Sergeant Sans-Soucy was present with his regiment by the side of the French Guards at the battle of Fontenoy; and doubtless he could hear Lord Charles Hay, of our English Foot Guards, at but fifty paces' distance, salute the Duke de Biron, and bid the gentlemen of the French Guards to fire first! It seems evident that Sans-Soucy must have been severely wounded in this hotly contested field, for in the following year we find him left behind his regiment and placed in charge of invalids, sick and wounded at an old castle in Piedmont.

Lieut.-General de Chevert,* commanding the French forces in Piedmont had fitted up the Château of Moncalvo † as his base hospital, placing Sergeant Sans-Soucy, who was convalescent, in command of the two hundred patients left there to get well. General de Chevert well knew and thoroughly trusted San-Soucy, for he had been one of the folorn hope column which he, when a Lieutenant-Colonel of the regiment of Beauce, had led to the assault of the fortress of Prague.‡ At the moment of planting the first scaling-ladder at the foot of the scarp, de Chevert, addressing the leading files of the detachment, had said to them: "Mes amis, you are all brave enough, but I must have next to me a brave man with a thick hide (*un brave à trois poils*, that is the actual expression he used) and Sans-Soucy is the man for me. Now you must mount first and I will go behind you. When you reach the top of the wall,

* M. François de Chevert, Lieut.-General of the French army, had also risen from the ranks, having entered as a recruit at eleven years of age in the regiment of Carneau.

† The Castle of Moncalvo is a few miles south of Casale on the river Po.

‡ Siege of Prague, December, 1741.

the sentry on duty will cry 'Vardô!' Do not answer; he will quickly let off his musket and will certainly miss you, on which you must fire and kill him. Then I and your comrades will rush on."

All turned out as he had foreseen. Sans-Soucy did as he was directed and de Chevert entered the city with his column and opened the gates to the remaining troops of the Marshal, Comte de Saxe,* who recommended de Chevert for promotion as brigadier-general. It was on this occasion, it may be supposed, that Sans-Soucy became corporal.

But to proceed with our narrative. For the moment matters were apparently tranquil. The position of the forces under the Maréchal de Maillebois † was as follows: Lieut.-General de Montal occupied Asti; the Marquis of Senneterre's division lay at Casale; General de Chevert as we have seen was at Moncalvo and the Irish General Lesci commanded the Spanish allied troops which were blockading the citadel of Alessandria. The Maréchal de Maillebois evidently considered his position assured, as he showed his contempt of the Austrian-Piedmontese army, by giving a ball every week at his headquarters in Valenza. Thus affairs continued through the winter of 1746 until March 1747. Suddenly the enemy broke up their camps and assumed the offensive. The wintry weather had passed away and on the 4th of March the Austrians under Prince Lichtenstein ‡ marched on Casale and Moncalvo, whilst Baron de Lentron and his Piedmontese moved down on Asti.§ In case he should find his post threatened by a large numerical superiority, General de Chevert had orders to evacuate Moncalvo and to fall back by forced marches on the main body of the Maréchal's army. As soon as he had reconnoitred the enemy, he found he must be overpowered and at once made his dispo-

* Maréchal, Comte de Saxe, who commanded the left wing of the French army in Bohemia. He has himself written the details of this brilliant expedition in his memoirs.

† Maréchal de Maillebois. Jean Baptiste François Desmarets, Marquis de Maillebois, son of Nicolas Desmarets and grandson of the great minister Colbert. He was created Maréchal de France in 1741.

‡ Prince Lichtenstein. Field Marshal of the Austrian army. He had been ambassador to France from 1738 until 1741. He died 1772.

§ Asti, an ancient city, situated near the confluence of the rivers Bonbore and Tanaro.

sitions for a rapid retreat in accordance with his orders. But to carry out a retreat with rapidity it was necessary to disembarrass himself of his wounded and sick, all the more that transport carriages were not available and that already the Austrian advance guard had crossed the road in front of him. De Chevert therefore made up his mind to leave behind him at Moncalvo all these non-effectives who could no longer be useful as combatants and Sergeant Sans-Soucy was left in charge of them with the following precise instructions. He said:

"Sergeant Sans-Soucy; I have every reliance on your prudence! You are to resist and drive off, with the few men who may be strong enough to use their muskets, any straggling parties of the enemy who may approach the château for plunder or to maltreat the sick and wounded. But, as you are unable to maintain a serious defense against an organized force, you must surrender yourselves as prisoners of war to the first Austrian officer whose column or detachment approaches. There is no doubt the Austrians will treat you humanely, as we have always acted in the same manner towards those of their forces who have fallen into our hands."

Having left these orders, General de Chevert moved off his battalions as quickly as possible and evading the Austrian advanced parties gained the Tanaro,* in which direction Prince Lichtenstein rapidly pursued him. Meantime, as soon as M. de Chevert had turned his back on Moncalvo, the gay Sergeant Sans-Soucy revolved over in his mind the precarious situation in which he was placed. He felt all his responsibilities, but, at the same time he by no means relished the idea of being made a prisoner of war. He racked his brains as to what he should do, and at length a happy inspiration possessed him. It had recurred to his mind that his noble general himself had once succeeded in extricating himself from a somewhat tight situation, during an emergency, although certainly it was on a much larger scale. It had happened in this way; and as he had taken part in the manœuvre he had good occasion to remember it.

After the taking of Prague, when the Maréchal de Belle-

* The Tanaro River, an important affluent of the Po, on which Alessandria is situated.

Isle* had suddenly marched his army out of it, on the night of the 17th December, 1742, he had left behind him Colonel and Brigadier-General de Chevert with only 800 men and a like quantity of sick and convalescent. With this feeble garrison de Chevert had held his own for a week, although closely pressed by Prince Lobkowitz† and his Austrians and, finally, threatened to blow up a portion of the city and to perish under its ruins with his garrison, if he was not granted an honorable capitulation and permitted to march out with the honors of war. These terms were accepted and de Chevert with the remains of his weak force marched out of Prague with all the honors of war, taking with him his sick and wounded, with two field guns, drums beating and colors flying, proceeded to Eyra, and gaining the complimentary notice of Queen Maria-Theresa of Hungary.

Having made up his mind to accomplish with 200 sick, wounded and convalescents what his commander had achieved with 800, Sergeant Sans-Soucy set to work to muster his well-nigh bedridden little force. Entering the large hall of the château where the chief improvised hospital ward had been formed with various ill-matched bedsteads, pallets and mattresses, he addressed the patients and, after inspecting the state of those who were most fit to fire through loopholes, succeeded in finding sufficient to handle the few firearms left them by their general. Assembling his ragged and somewhat impotent crew, of varied aspect and indifferent as to their uniformity, he thus addressed them:

"Look here, my friends! We have some muskets and cartridges. Don't you think we might manage to make some slight resistance to these d——d Austrians? Who knows but what we might not beat them off for a while at least and then obtain terms from them as our General de Chevert did at Prague?" The jovial humor and the imperturbable gayety of

* Maréchal de Belle-Isle; Charles Louis Auguste Fouquet, comte de Belle-Isle, a grandson of the famous minister Fouquet. He was a distinguished soldier, and first ordered his officers not to appear out of uniform. After the capture of Prague he was sent by Cardinal de Fleury as ambassador to Frankfort.

† Prince Lobkowitz: the Austrian general who blockaded Maréchal de Belle-Isle in Prague. He did not die until 1802.

Sans-Soucy had altogether gained the ascendency over the maimed wretches during the six weeks that the sergeant had been in charge of them and they raised a quavering but answering cheer of assent. "Well! let's set about putting this tumble-down old place into a state of defense! Where are our sappers? Hurry up!" Sure enough there were two or three sappers who were able to show them how to make some sandbags, how to block up entrances. The ancient loopholes, probably constructed for cross-bow men, were cleared out or enlarged for musketry. The mullioned windows barricaded and closed with sandbags, shutters, and mattresses. The *machicoulis* of the turrets were cleared from birds'-nests and accumulated leaves.

A ditch was dug in front of the principal entrance which had replaced the ancient drawbridge; the earth was heaped up against the great doorway, which was further strengthened by logs of timber and odd beams which were obtained from the outhouse; whilst *abatis* of felled trees were disposed in the principal approaches. An old iron cannon, an ancient piece of honeycombed ordnance, was fished out from a corner where it had lain hidden for many a long year, and remounted on its platform at a commanding angle of the building; and, altogether, the château was put in a creditable state of defense, had it only a garrison of effectives wherewith to man the improvised. And it must not be forgotten that many of these old castles in Italy, like the châteaux of France,* were orginally built as defensible works.

The old flagstaff was propped up and something approaching a distinct resemblance to a French standard manufactured from a not too clean sheet and some bits of gold lace. Some cartridges were broken up and a charge or two of powder thence obtained to load the one old cannon, and a bag of musket balls and slugs sufficed for grape and canister shot.

Some days passed and no signs of the enemy appeared, until one fine morning [M. Henry Houssaye here forgets his precis-

* M. Dieulafoy, the distinguished archæologist, so well known for his excavations in Susiana, has just published in Paris a description of the Château Gaillard, built by Cœur-de-Lion on the bluffs above Les Audelys. This is well worth reading by all those who desire to know how these strongholds were designed in the Middle Ages.

ion and does not give us the exact date—indeed reporters were not frequent in those days] a column of Piedmontese reached the hamlet of Moncalvo, from which a party was detached to take possession of what they supposed to be the abandoned hospital. When this detachment, marching with great nonchalance, came in sight of the château, the officer in charge was astonished to see what was apparently a French flag flying from the turret, whilst a puff of smoke and a shower of bullets in the bushes and trees somewhere near them, or at least in their direction, still further startled the composure of the detachment. On continuing their advance with more caution, the Piedmontese were received with a fairly well-sustained fusillade, which stopped all further progress and sent the detachment seeking cover some way to the rear, although no actual harm happened to any one. Perhaps it was as well for the French defenders that no casualties occurred among the ranks of their assailants. As it was, the officer commanding at once sent word back to his immediate superior in the village that the hospital was still occupied, and in a state of organized defense, with a garrison disposed to fight like devils. Upon this two battalions and a battery were told off by Baron de Lentron to reduce the château; and there was something in what he heard of the singularity of this defense that induced the baron himself to accompany the battalions to the scene of action.

The baron gave orders to summon the garrison to surrender; and the acting governor, Monsieur, le Sergeant Sans-Soucy, condescended to himself parley with the Piedmontese Commander-in-chief; but this was only to declare that the hospital had now become a fortified post, provided with a strong garrison, which was, moreover, determined not to surrender until reduced to the very last extremities. It is evident, says M. Houssaye, that there was something of the Gascon in this sergeant of Lorraine.

"I shall not capitulate," said the witty sergeant, "until after the artillery shall have made a breach in the main body of the work, and when I shall see a trench opened—if it is only as long as the stem of my pipe." Amused by the good humor and gallant bearing of the Frenchman, de Lentron replied—"All right, my good friend, you shall be served according to your taste."

Mr. Henry Houssaye admits that he cannot find out whether a trench was really opened, as Sans-Soucy had required or not; but at any rate he tells us it is certain that the ruinous château was pretty briskly cannonaded, perhaps for some couple of hours, to which a reply was made by the rickety old iron gun, until it fell off its platform, and the irregular musketry fire from the loopholes, until a good many of the invalid defenders were wounded and the great gate of the château shattered to bits. In order to storm the place it was only needful to throw a few fascines into the ditch which had been dug before the gate. On seeing preparations for the assault, Sans-Soucy caused a drummer to beat the *chamade* for a parley. Received under a flag of truce by Baron de Lentron, Sans-Soucy declared that honor being saved he was disposed to give up the place, if he obtained an honorable capitulation of which he fixed the conditions. His garrison should march out with arms and baggage, march past the Piedmontese troops, and have safe conduct to the headquarters of Maréchal de Maillebois. In addition, Sans-Soucy had the assurance to request a few donkeys to carry away those of his sick and wounded who were incapable of making the journey on foot. Sans-Soucy, as Mr. Houssaye says, had undoubtedly got over the Baron de Lentron by his gasconnades; but we cannot help suspecting that the Tournaisis sergeant was fortunate in finding a Piedmontese officer inclined to humor, and good-naturedly tolerant of the audacity and wit of the non-commissioned officer who, in truth, was not entitled to any quarter for holding out in an indefensible post. General de Lentron benevolently granted all the terms and even sent as many donkeys as were required.

On the next morning the garrison marched out from the hospital. At its head a lame drummer beat the march. Sans-Soucy, accompanied by a corporal with his arm in a sling and a lance-corporal, whom he had promoted during the siege operations to act as aide-major, saluted gayly with his halberd the Piedmontese officers. Behind him, mounted on the donkeys, came the worst cases—the bedridden and those wounded during the previous day's fighting. Next defiled the main body, limping and bandaged, but all carrying their arms at the shoulder, and in good order, three abreast. In rear, that nothing might

be wanting to the full honors of war, was drawn a cart, which followed the motley column, containing the siege matériel in the shape of hospital utensils, etc. The Piedmontese could not refrain from raising a cheer in honor of the brave little band which made its way safely to the French outposts at Novi. Needless to mention the acclamations with which this unexpected train of invalids was received in the French camp, Maréchal de Maillebois, not content with congratulating Sans-Soucy on his courageous action, at once sent to the king a report of the whole affair; and by the return mail from France Sans-Soucy received the gazette of his commission as Lieutenant of Grenadiers in the Regiment of Tournai. The Maréchal determined to publicly recognize him as officer, and at a general parade, the troops were formed in hollow square, facing inwards. The newly promoted lieutenant was called out to the centre and the Commander-in-chief himself read out the statement of the achievement for which Sans-Soucy had received the token of royal favor. In the midst of the reading Lieutenant Sans-Soucy is said to have interrupted the Maréchal. "Pardieu Monsieur le Maréchal! Will you be pleased to read it over again to me?" as the newly promoted soldier could hardly believe his ears. The Maréchal willingly recommenced to read out aloud the eulogium of the king and the bravery of the sergeant's deed; upon which the Lieutenant of Grenadiers, intoxicated with joy, cried out—"The devil take me, but the king speaks the truth!"

Sans-Soucy did not remain long in the rank of lieutenant. He was nominated soon after to be aide-major at Neuf-Brisach. Later he is heard of as a Chevalier of Saint Louis, and lastly as Captain of Grenadiers. But he was now no longer known as Sans-Soucy. He had reassumed his true name, at least with a slight modification. He signed his name as *d'Aubry*, with a *d* and an apostrophe. He found this little addition had the best possible effect, and he judged, rightly, without doubt, that the famous defense of the hospital of Moncalvo well deserved the added particle.

Such is the story which M. Henry Houssaye, the delegate of the French Academy, told the assembly of savants at the last great meeting of all the sections of the Institut de France, and

although the story has been told with variations and exaggerations often enough before, still this seems to be the first occasion on which the truth, or at least the truth as nearly as it can be arrived at, has been recorded by a brilliant Academician; and it may, therefore, be regarded as bearing the definite stamp of authenticity. It is in this respect that it merits a place in the pages of the *United Service Magazine.*

DEATH IN BATTLE.

(*From the London News.*)

PROBABLY the most impressive description of death in the field of battle ever penned was that which Kinglake has left of Capt. Nolan's fall. Nolan was aide-de-camp to Gen. Airey, and in that capacity was the bearer of a written message from the Commander-in-chief to Lord Lucan, in command of the Light Cavalry at Balaclava. On receipt of the order, Lord Lucan gave Lord Cardigan instructions for that terrible "charge of the Light Brigade," which Nolan believed to be altogether a misinterpretation of the directions of the Commander-in-chief. As the brigade moved off toward the valley of death he dashed, in the greatest indignation and excitement, across the head of the advancing troops and endeavored to divert them into what he believed to be the course intended by Lord Raglan. According to Kinglake, he rode across with vehement gestures and uplifted sword in advance of the brigade as if beckoning the cavalry to follow him and not Lord Cardigan. But a Russian shell bursting on the right front there, a fragment, which met Nolan full in the chest, tore a way into his heart.

"The sword dropped from his hand," says the historian, "but the arm with which he was waving it the moment before still remained high uplifted in the air, and the grip of the practised horseman, remaining as yet unrelaxed, still held him firm in the saddle. Missing the perfect hand of his master, and finding the accustomed governance now succeeded by the dangling reins, the horse all at once wheeled about and began to

gallop back upon the front of the advancing brigade. Then, from what had been Nolan—and his form was still erect in the saddle, his sword arm still high in the air—there burst forth a cry so strange and appalling that the hearer who rode the nearest horse has always called it 'unearthly.' And in truth, I imagine," says Kinglake, "the sound resulted from no human will, but rather from those spasmodic forces which may act upon the bodily frame when life as a power has ceased. The firm-seated rider, with arm uplifted and stiff, could hardly be ranked with the living. The shriek men heard rending the air was scarce other than the shriek of a corpse. The dead horseman rode on till he passed through the interval of the Thirteenth Light Dragoons. Then at last he dropped out of the saddle."

A scientific man, commenting on this story of the death of Nolan, is inclined to ascribe the uplifted arm and the retention of the seat in the saddle to the influence of intense excitement "dominating every element of activity as long as any activity remained." He thinks that if Nolan had been quietly jogging along in the ranks of the six hundred, thinking of nothing but keeping in line and getting ahead, he would at once have gone to the ground under that blow. But, as a matter of well-established fact, incidents of a similar kind have been often noted on the battle-field. During the American Civil War a great many were recorded. For instance, Capt. A. H. De Graff related that a sergeant of the Fifty-seventh Massachusetts, in charge of the Ninth Corps on the Confederate works east of Petersburg, leaped upon the parapet, and, with his cap in his left hand and his musket in his right, stood cheering and gesturing with his arms to incite his comrades to come on. Suddenly a shell took his head off as completely as a knife could have done, but the tall form continued erect for some seconds, the arms still waving frantically, but with ever lessening sweep and power, until the forces of the body collapsed, when the headless trunk toppled over to the ground.

There was, it seems clear, nothing very exceptional in the case of Capt. Nolan so far as the retention of the seat on horseback and the sustaining of the arm were concerned; the ghastly feature of the incident was the blood-curdling shriek of what

Kinglake regards as the soldier's corpse. This has been explained as the effect of the collapse of the chest walls. That explanation would, no doubt, be sufficient to account for something like a deep sigh, but, surely, could hardly be the cause of such a cry of unearthly agony as could be heard above the tumult of a brigade of cavalry in motion. It probably was not the mechanical collapse of the chest walls that drove it forth from a corpse. It was far more probably the last despairing cry of a living man, or some involuntary play of nerve and muscle before the final extinction of the vital spark. And here again the incident was not by any means unprecedented, though, according to Kinglake's description, the really hideous circumstance was that the wild cry of agony broke from the lips of the unfortunate captain some time after the fatal stroke. There are many instances on record in which a mortal wound has extorted a piercing cry at the moment of injury, and sometimes the cry has been accompanied by extraordinary muscular action.

THE MUDDLES OF ANCIENT ROME.

By J. B. HODGE.

(From The United Service Magazine.)

IT has been recently stated, on high authority, that England always begins her wars with a muddle, though it is difficult for any student of military history to accept that statement without very considerable modification, unless he can close his eyes to the fact that the Abyssinian War and the Ashanti Wars of 1873 and 1896 by no means stand alone as having been carried through with a promptitude and precision which left nothing to be desired. But, reversing the old proverb, "What is missed is mystery," the wars where our success has been complete have left little or no mark on the memory of the nation; it is only the muddles which write their history there, in blood and tears. The wars we recollect are either those in which we braced ourselves, from the first, for an exceptional effort, or those which astonished us by some such unexpected disaster as Isandula. An unexpected disaster, obviously, implies miscalculation or mismanagement, some-

where; an exceptional effort involves operations we have had no opportunity of rehearsing. Consequently, muddles occur in all the wars which we recollect, and we are inclined to take an unjustifiably pessimistic view of our army organization.

Now, though it must be admitted that it is better to be over-critical than too easily pleased in a matter of such supreme importance, it is only fair to the War Office, an institution which has few friends left in England, to recollect that the greatest military power the world has ever seen—I refer, of course, to ancient Rome—was also in the habit of beginning its wars with a muddle. Rome's "slowness in getting off the mark," to borrow a metaphor from the cinder-path, is sufficiently apparent, throughout the whole course of Roman history.

Take, for instance, the second Punic War. Although Hannibal had to execute a march of some thousand miles before arriving at the scene of operations, yet the Romans lost three great battles and an aggregate, according to their own historians, of eighty thousand men in the first years of the war. It may be said that, in that case, they were pitted against a heaven-born genius; but no similar excuse can be brought forward to explain their two years of fruitless manœuvring against Philip of Macedon, the next time they were engaged in hostilities. Antiochus of Syria, their next antagonist, had time to transport his army from Asia Minor, and overrun the whole of Thessaly and Northern Greece, before he so much as saw a Roman soldier; though, so incapable was the Eastern monarch, and so inefficient his troops, that a single campaign sufficed to strip him of all his conquests. In the second Macedonian War two consuls in succession were repulsed from the enemy's frontiers, a third was only slightly more successful until he was forced to retreat by the failure of his commissariat; none the less, the fourth finished the war and the history of Macedon.

The third Punic War was an exceptionally strong instance of the slowness with which the Roman army settled down to their work. The Carthaginians themselves were so convinced of the futility of any resistance they could offer, that they were prepared to surrender unconditionally before a blow had been struck, and even went so far as to hand over all their arms and military engines. Then the Romans, with scandalous ill-faith,

promulgated a further ultimatum, demanding that Carthage should be destroyed and re-built at a distance from the sea. Even unconditional surrender had not been understood by the Carthaginians to imply the irrevocable extinction of the trade by which they lived, so they determined to "take it fighting." Two hundred thousand sets of arms and two thousand catapults had been given up to the Romans—recent experience might incline us to conjecture that these were mostly of an obsolete pattern—but the number seems to forbid any such supposition, as the military science of antiquity did not advance with such rapid strides that many weapons of an exploded type were likely to be in existence. A city which had just surrendered such a quantity of arms could hardly have been expected to offer much resistance to the force sent against it as sufficient to subdue it when its armament was complete. All the same, two years fighting against a populace fired, indeed, by despair, but also crippled by internal dissension and armed only with such weapons as had remained in private keeping, or could be improvised for the emergency, advanced the Romans not one step towards their goal; and, though better progress was made after Scipio assumed the command, another year elapsed before the town was stormed.

What might have happened if Carthage had been attacked before it parted with its armament, was shown in the subsequent case of Numantia. There a Roman general, sent to reduce a single Spanish town, was not only forced to raise the siege, but so hard pressed in his retreat that his army only escaped destruction by a capitulation less disgraceful to Rome on account of the disaster which rendered it inevitable, than of the bad faith with which it was disowned. Rome continued the war, and brought her whole power to bear against a town which could only put eight thousand fighting men into the field; yet it took four years to conquer those eight thousand men.

About the same time the first Servile war broke out in Sicily, and a Roman army, as numerous as the whole force of Numantia, was completely defeated by a rabble of mutinous slaves; and this disaster was not entirely "wiped off the slate" until three years later. In their war with Jugurtha the first cam-

paign brought the Romans no success, the second resulted in a defeat so unequivocal that a convention was concluded by which they agreed to evacuate Numidia. Again the Senate disavowed the treaty, and again the Romans emerged from the struggle victorious.

Meanwhile their arms had been conspicuously unsuccessful in the north, where the Cimbri inflicted four reverses on them in the course of eight years. In the fourth engagement, on the fatal 6th of October, eighty thousand legionaries are said to have fallen. But the Romans "muddled through," as usual; and the sometime triumphant barbarians were exterminated at Aquæ Sextiæ and Vercellæ. It would scarcely be fair to lay much stress on the disasters of the second Servile war, as they occurred while this struggle with the Cimbri was absorbing most of the strength of Rome.

But there was no such excuse for the bad start which the Romans made in the Social War, perhaps the most desperate of all the struggles through which they achieved the mastery of the world, for the Romans were then pitted against those very allies who supplied two-thirds of their army for their other wars. But, as these allies had to consolidate themselves into a state during the progress of hostilities, it might have been expected that the established power would have had the advantage at the start. But such was not the case, any more than in the very similar modern instance of the American Civil War, though our knowledge is not sufficient to decide whether the early successes of the anti-Roman confederacy were due to the same causes which enabled Jefferson Davis to make such formidable head against all the resources of "Uncle Sam." But it is certain that, at first, the rebels gained considerable advantages. Pompeius was beaten at Asculum, Cæsar in Samnium, and Crassus in Lucania—it is scarcely necessary to remark that these were not the celebrated generals who formed the first Triumvirate, but the juxtaposition of those three names is curious—Perperna, in a battle fought in some unspecified locality, lost four thousand of his men; Cæsar did, indeed, repulse an attack on his camp, but the other consul, Rutilius, was defeated and slain; then, after some minor operations of indecisive result, came the crowning disaster, in which a Roman army of thirty-

five thousand men was practically annihilated. The records of this period are too fragmentary even to give names to the battles, and do not enable us to trace the steps by which the Romans redeemed the situation. We only know that they did redeem it, and brought the war to an end, after three years' fighting, which cost the Italian peninsula the lives of three hundred thousand of its sons.

The first war with Mithridates affords an even more conspicuous example of the same general rule, since, in that case, as the Roman governors of the province of Asia deliberately forced the war on a reluctant enemy, they ought to have been thoroughly prepared for it. None the less, hostilities opened inauspiciously for the Romans; one of their commanders was routed and his camp taken, and the other only escaped a similar fate by a precipitate flight. Mithridates not only overran all the Roman possessions in Asia Minor, but even carried the war into Europe. Still, as soon as Sulla took over the conduct of operations, the tide turned against the Asiatic monarch; he was speedily driven back into his own continent, and only the state of Roman domestic politics at the time preserved him from a complete overthrow.

It is unnecessary further to prolong this catalogue, which already includes every war of importance which the Romans waged during a period of one hundred and forty years. But enough instances have been quoted to show that initial defeat was a normal, as ultimate victory was an invariable feature of Roman warfare. Some reasons for this are fairly obvious, and two, at least, of them are as operative in the England of to-day as they were in the Rome of two thousand years ago.

It is true that we do not expect our politicians and statesmen to take the command of an army, if necessary, as the Romans were in the habit of doing. Nobody has suggested that Sir Alfred Milner should direct the movements of our field force in South Africa, and that if large reinforcements became necessary, Mr. Chamberlain should be sent to supersede him. This parallel is, perhaps, a trifle unfair, because every Roman official, before attaining the higher offices of the state, had to acquire a certain amount of military experience and to discharge the duties of the subordinate post of quæstor. Still, it is the fact

that one of the consuls naturally took the command in any important campaign, and the local governor in any minor operations; though neither consul nor governor, except during grave national emergencies, had been selected for military capacity. The consequence was that, when a war broke out, the Roman forces generally found themselves under the command of a chief who possessed only just enough military knowledge to believe himself independent of the advice of his more experienced subordinates. If this led to any very serious disaster, the Romans bestirrred themselves to send the best man available; but if the war opened with only a few trifling checks, they worried through it on the old system. Sometimes, a general selected on account of his prominence in home politics proved a triumphant success, like Cæsar; but it was more usual for him to prove a disastrous failure like Varro. Still, it was only very occasionally, and after repeated disasters, that the Romans ever selected a general because they had reason to believe that he could lead an army. Dentatus, the two Scipios, and Marius are about the only instances which can be quoted.

In that respect we may, without boasting, claim that England has improved upon the example of Rome; but two other causes contributed to put the Romans at a disadvantage at the beginning of their wars, which equally handicap the British empire to-day. The Romans, partly from motives of economy, partly from well-grounded confidence in the quality of their soldiers, always tried to fight their battles with the smallest possible force —a line of policy which sometimes exposed them to humiliating checks from comparatively feeble foes. There must always be great need for accurate calculation in such matters, since, setting aside financial considerations, the rate of mortality from disease on active service has always been so high that it would be truly criminal to send 30,000 soldiers on an expedition when 10,000 would be sufficient. The Romans, however, seem to have habitually erred on the side of cutting the margin too fine, and, looking at the history of the last hundred years, one may be excused for doubting whether an Englishman has any right to criticise them on that score.

Moreover, as the Roman power spread more and more widely over the shores of the Mediterranean, their legions were

brought into collision with a variety of enemies of the most diverse methods of warfare and national characteristics. Soldiers trained under the same system had to face the spearmen of Macedon, the swordsmen of Spain or Gaul, the mounted archers of Parthia, and the lancers of Numidia; and the lessons of one war had to be unlearnt in the course of the next. Is it to be wondered at that the consequences were occasionally disastrous? We are apt to forget that Flaminius, who was so palpably out-manœuvred and entrapped by Hannibal at Thrasymenæ, had previously won a battle against a very superior force of Gauls. Crassus, before he led his army to destruction at Carrhæ, enjoyed a high reputation as a general; but all his fighting had been done against foes armed and trained like his own soldiers, while the most distinguished officers on his staff had won their spurs in Cæsar's Gallic campaigns. Exceptional men like Pompey, and perhaps, in a less degree, Cæsar—for Cæsar never took command of a fleet—seemed able to adapt themselves to any enemy they might be called upon to meet; but the ordinary Roman general found it hard to avoid being misled by his experience. What was true of the leaders was probably true of their soldiers; and we may safely set down some of the reverses, with which Roman wars so frequently opened, to the perplexity of the Roman "Tommies" when confronted by a strange enemy in a strange country.

The Roman legionary was no match for the Spaniard, as Livy tells us, in hill-fighting, nor could he resist the shock of the Macedonian phalanx on a level plain, or overtake the horsemen of Parthia in the desert. The elephants of Pyrrhus filled him with affright, and he had to be kept behind entrenchments when first assailed by the impetuous onslaught of the Cimbri. Yet he eventually got the better of all those enemies, partly by his matchless determination and endurance, and partly by the employment of a system of tactics which, though not the best possible under any given conditions, was never hopelessly inapplicable.

Would it not be fair to draw from the history of Rome the conclusion that our much-abused War Office is not quite as black as it is painted, or, without prejudging that question—for he is no friend either of that office, or to his country, who would

shut his ears to a single sentence of well-considered criticism—to reflect that, for a "world-power," a check at the opening of a war does not necessarily imply any serious flaw, either in leadership, organization, or personnel. If our army had been trained with a single eye to the exigencies of South African warfare, we might have been justified in our outcry when we found that our soldiers were, in some respects, inferior to their foes in fighting on the veldt. But, as a South African war had been only one, and that not the most probable, of the contingencies which that army was kept on foot to meet, it would have been fairer, as well as more dignified, if the English nation had prepared itself for some unpleasant occurrences while our soldiers were taking the measure of their enemy and of the scene of conflict.

No doubt every defeat means a mistake somewhere; but our institutions are human, our soldiers and their leaders are human likewise, so mistakes must, at all times, be only too numerous. But it remains to be proved that they were more numerous than the nature of the case rendered probable; so, if we remember that the great military power of antiquity generally "muddled," though always "through," a study of the classics may not be so useless as it often appears to be.

COLLECTIVE PRACTICES.

By Major J. H. SWANTON, D. I. M., Western District.

(*From the Journal of the Royal U. S. Institution.*)

THE proper performance of collective practices is really the outcome of perfect fire discipline.

The term "fire discipline," better expressed by the term "fire control," meets us at every turn. Whatever particular portion of musketry we discuss, with the exception perhaps of individual firing, is really all mixed up with that well-worn subject, and why? Because the aim and object of all our manœuvres and drills is eventually to bring such a superiority of fire on the enemy, whether in attack or defense, as will crush him in the end.

Strategy means moving the various portions of an army from a distance so that they can eventually meet the enemy and out-

manœuvre him (as in the case recently of General French at the relief of Kimberley), but when in touch with him, tactics step in to place the various units in positions where they can most favorably use their powers of offense and defense for the destruction of the enemy. Such was Lord Roberts' never-to-be-for gotten capture of General Cronje's army. It is then that discipline and collective practices come into play.

Now, let us take shortly what both the Infantry Drill-Book of 1896 and the Musketry Regulations, 1898, say on the subject of fire discipline, and then reproduce what the latter book says on the subject of "Collective Practices," and subsequently call attention to various more minute detaiis, which are most essential to insure the correct performance of these practices.

The Drill-Book says that fire discipline means:

a. Strict attention to all orders from the commander.

b. Control of the amount and direction of fire.

c. Insures careful adjustment of the sights.

d. Teaches the power of remaining under fire without replying to it.

e. And finally, in the din of battle, when casualties amongst officers and N.-C. officers remove all superior control, enables the soldier to continue to deliver his fire in the best direction with deliberation and coolness.

And it goes on to say:

"The physical strength and endurance of the attacking force are highly tried by the fatigue inseparable from a long advance under fire, and the assault is consequently delivered under difficult conditions. These can only be counterbalanced by absolute obedience to orders, and strict fire discipline."

So much for the Drill-Book.

We now turn to the Musketry Regulations, 1898, and it is with these that we are most concerned.

In these Regulations the following will be found:

"The general expression 'fire discipline' embraces the several connecting links in the chain of responsibility from the issue of the order to the actual delivery of the fire."

This is sub-divided into three heads, which are shortly reproduced as follows, viz.:

1. General direction.
2. Judicious control.
3. Rigorous discipline.

Now, we are not actually discussing fire discipline, but we cannot altogether avoid introducing the term on account of its intimate connection with collective practices. The words "fire discipline" have never seemed to convey any distinct meaning. You have been given what our two text-books define "fire discipline" to be; but as far as we are concerned the term "fire control," or "control of fire" is preferable, for, in order to be really effective, fire ought to be controlled, and well controlled.

Here is what the Musketry Regulations say on the subject:

"Experiments have shown that if fired under similar conditions, a succession of controlled volleys, or independent (*i. e.*, collective firing), is more effective in the field than an equal number of shots fired individually. The introduction of smokeless powder has removed the great disadvantage which independent formerly labored under, so that it might now with advantage be more frequently used; moreover, in peace-time, statistics have proved that the results obtained may be better than volleys. But everything considered, volley firing is the description of fire (collective) generally employed, while independent is exceptional."

Some of the reasons for this are as follows.

Volleys admit of:

1. Complete control of direction and of concentration of fire. N. B.—Where it is not always possible to see the effect of a single shot, the effect of a volley may generally be noted.
2. Correction of elevation and direction.
3. Keeps men well in hand.
4. Is an aid to discipline.

Having thus alluded to "fire control," let us now turn to Table "B," Appendix VIII., Volunteer Regulations, 1899. There it will be found that out of the 42 rounds to be fired annually, 14 rounds are now to be fired in collective practices by all who wish to be classified as "Marksmen" (except color-sergeants, sergeants, or lance-sergeants), and these must have commanded

a section in firing 7 deliberate volleys at 500 yards, and 7 rounds in rapid independent also at 500 yards. Further, there is a footnote to the effect that if, owing to the want of range accommodation, which it is sincerely to be hoped may be of very rare occurrence, these 14 rounds should unfortunately have to be expended in individual practices, the scores will not count toward the figure of merit, or classification, and also that special arrangements must be made for these non-commissioned officers to command sections who will fire the collective practices with blank ammunition, thus showing how important the subject of collective practices is considered, *i. e.*, that if they cannot be actually gone through with ball ammunition on the range, the same procedure must be carried out with blank, in order that "fire control" can, at any rate, be practiced.

In order to illustrate the importance of these practices, we may deal shortly with the three headings into which "fire discipline" or "fire control" is divided in the Musketry Regulations:

1. *General Directions.*—This is amplified by the Regulations into the "intelligent general direction and regulation of fire on the part of the senior and subordinate officers and leaders."

The word "intelligent" means a great deal, especially when taken with the words "general direction and regulation of fire." It has been found, unfortunately, on more than one occasion that it is quite possible for those in superintendence to endeavor to generally direct and regulate fire without doing it "intelligently." To do so it means, in other words, "to use one's eyes." If superintending, observe the effects of the volleys. Should they fall short, use a long whistle, and increase the elevation, or, with "fixed" sights, direct the aim to be taken at a higher point on the target. It is, however, especially necessary to bear in mind that if after a volley has been fired, and no effect at all be apparent, it may be taken for granted that the elevation was too great, and the sight or aim should accordingly be lowered. This, however, depends on the nature of the ground both in front and in rear of the object. Such a case might easily occur with a rough sea in rear of the target, and it did actually happen on a west country range last year, when

six long-range volleys were fired at a target placed on the seashore at a distance of about 1200 yards, but the bullets were not observed to strike anywhere. Had the elevation been decreased after each volley, as it should have been, the shots would in this instance have at least been seen falling short, and so the correct elevation might eventually have been found. That no attempt was made to do so showed want of "intelligent" direction on the part of those "generally" directing the fire.

There is one other point which should be impressed on those who are superintending a practice, and that is, if it be wished to correct a mistake, change the aim or description of fire, or should a "ragged" volley be fired a long whistle must be blown at once for "cease fire." Then correct the mistake—change the objective, or endeavor to steady the section whilst the men are in the "ready" position; but, above all things, the section commanders or men must not be interfered with whilst firing is actually going on.

Officers at target practice should always be provided with field glasses, and should use them.

In the case of an officer commanding a company, the preliminary caution should be as short as possible. If deliberate volleys, it is sufficient to say:—"Volleys at the right, left," or particular portion of the target, "Fixed sight." Let the section commander do the rest. The reason this is mentioned is that some officers have been heard to say, "Volleys by sections commencing from the right, at the target," etc. Now, this is by no means wrong, but unnecessary, for it is a good thing to teach that volleys are always by sections or sub-sections, commencing from the right unless otherwise ordered, the "present" of the previous section being the signal for the "ready" of the next, and so on for the first volleys only. After that they are fired independently. There is an exception to this, and that is in firing long-range volleys, when the Musketry Regulations say:—"Only company or half-company volleys will be fired at this practice." Perhaps because the larger number of rifles fired together at a long range the greater the effect produced, and the easier it will be to observe the result.

2. *Judicious Control.*—This concerns section commanders

more nearly. Almost everything depends on the way in which they handle their sections, and this is a fact which cannot be too strongly impressed upon them. If possible they should always remain in command of the same section, for it is a matter of considerable importance for the men who compose a section to know their commander's voice, as in this way the likelihood of one section taking the command to fire given to another as meant for themselves is reduced to a minimum. With a good section commander, good volleys, good results, and very much *vice versa*. There is a great difference between "judicious control" and "injudicious control." What may be termed "injudicious control" is shown by a section commander who, though he may know his words of command, repeats them like a parrot and without using his eyes. Let us take, for instance, deliberate volleys at 500 yards. The injudicious commander says, "Volleys—kneeling—ready—at the target, etc., all in one, without a sufficient pause between each, and without appreciating the difficulty there is for men to get into the kneeling position, especially with untrained men, and so on. What is the result that may be expected? He has not waited, first of all, to see his men at the "ready" comfortably, and does not allow for the fact that it takes time to get a cartridge out of the pouch, especially when there are a few in it. He does not see the sights properly adjusted (a most important duty of every section commander, who should go along his section and see this done), so that when the order "present" is given, perhaps half the section are still struggling with their cartridges, others are trying to close the breech or adjust the sight, and, in the end, perhaps one-third of the section may be got to the "present" in a very unsteady condition. In this perhaps slightly exaggerated case, the commander has been correct as far as his orders go, but without waiting for or appreciating the difficulties of his men.

What should be done is: Before issuing a fresh order, see that the previous one has been carried out. As, for instance, "Volleys—kneeling—ready," it should be seen that the men are in a good position on the knee, and comfortably sitting on their heels, and so on. One of the most important points is, however, the target to be fired at is a sectional one, 4×8 feet;

but, though it is so large, it is easily missed at even the shortest ranges, hence it is essential that the exact portion of the target to be aimed at should be particularized, such as "at the bottom of the second figure from the left or right of the target," or "the right or left bottom corner," etc., according to the direction of the wind; and that the effect of the first volley or two be most carefully watched, in order that the correct elevation may be accurately obtained. If the whistle sounds the "cease fire," the men must at once come to the "ready" position and remain still, waiting for further orders, for this is the vital point of all fire discipline, viz., to be able to get men to stop firing instantly when ordered.

Finally, in giving words of command, let there be as little noise as possible. They should only be given loud enough to be heard by the section for which they are intended. With regard to "rapid independent." One of the principal dangers in connection with volunteer rifle ranges is the fact that in charging magazines with rifles held as they are ordered to be at present, men are very apt to forget to close the cut-offs before closing the breech, so that a cartridge is forced into the chamber, and when springs are eased the rifle goes off, and then no one can tell where the bullet may go, or what damage it may do. To obviate as far as possible this danger the officer in charge of a company should teach his men that after they have placed the requisite number of cartridges in the magazines they should close their cut-offs only and remain still. The officer should then pass down the ranks, satisfy himself that all cut-offs are closed and the men be instructed to close the breech and ease springs as he passes. In this way, what is in reality a great danger can be considerably lessened, if not done away with altogether. In this practice, unlike the deliberate ones, the whistle is only used at the commencement and at the end of the one minute allowed for the firing of the seven rounds. This time is ample, and there is no necessity for hurry, for aim can be taken deliberately and accurately, and the rounds fired in the time allowed.

3. *Rigorous Discipline.*—Otherwise unhesitating obedience. This heading concerns the men themselves. It may be divided into:

a. Getting into proper positions. With recruits a rigid compliance with the firing exercise is most essential. The positions given there are taken from what our best shots found most comfortable and steadying and therefore they should be very carefully taught. Afterwards in the case of trained soldiers who are firing Table "B," it is not so necessary to insist on the regulated positions, because by them a man is supposed to have found that which, differing very little from the one laid down, is most comfortable for himself, and so gives the best results, It is, however, to be borne in mind that the positions in successive firing exercises undergo slight alterations, each one supposed to be an improvement on those already in use, and in such cases it is well to get the trained soldier to conform to them.

b. In loading, those who have been accustomed to the Martini-Henry rifle find a difficulty in not forcing the cartridge into the chamber before closing the breech. This should be particularly avoided. Place the cartridge on the cut-off in front of the bolt, and then force it home with the same. Otherwise the extractor may not get hold of it, and a jam will occur.

c. When the long whistle sounds, return to the "ready" position, and remain still.

In conclusion, it must be understood that we have been dealing with the Musketry Regulations as they now are, and as we have still to teach them. We are, of course, not in a position to state what effects the present war may have on them; but though individual fire will in all cases have first to be taught, it is in the controlled collective practices that we have shown, and will, we hope, still continue to show, our superiority over an untrained foe, because well-regulated fire is the outcome of perfect discipline, and it was perfect discipline that kept our men on several occasions recently, lying in exposed positions under an appalling fire, and firing themselves for a whole day in a burning sun, as at the Modder River under Lord Methuen, and the Tugela under General Buller.

From an intelligent and graphic account by an officer who took part in the battle of Graspan, it would appear to be more than probable that volleys will either not be used at all in the "attack," or that they will be done away with within 800 yards from the position, for in that action, and no doubt in many

others too, it was found that owing to the noise of firing and the distance of the men apart, controlled independent had to be resorted to from about 700 yards. In the defense, volleys at ranges from 1500 to 1200 yards may still be retained and be found effective, when the men are well placed under cover and close together, against objects forming large targets, such as troops in close columns; but on the whole it would seem that controlled independent will, at medium ranges, in future give the most satisfactory results.

THE SOUTH AFRICAN WAR.

(From the Army and Navy Gazette.)

THE temporary return of Lord Roberts to Pretoria, as indicated by his despatch of Monday, was an important event, as demonstrating clearly that he considered his brilliant campaign against Botha to have been crushing and decisive, and that the scattered remnants of the Boer general's forces might be left to be dealt with by the pursuing columns of Sir Redvers Buller and his other capable lieutenants operating in the eastern Transvaal. The Commander-in-chief returned to the front on Wednesday, after placing the Transvaal under martial law, and giving evidence before the Hospitals Commission. Although we have for some time become accustomed to the snatching of easy victories from commandoes more sensitive about their means of retreat than the defense of their positions, the feebleness of the stand made in the defensible mountain gorges south of Lydenburg was surprising considering the great importance of that town to the enemy's cause, and that but few strategic points now remain in their hands. The comparatively undisputed capture of Lydenburg was due in a great measure to the swift turning movement of General Ian Hamilton, advancing from the south-west by the Dullstroom road round the Boer right flank while Sir Redvers Buller engaged their left. By means of the turning movement by one or both flanks, and employed either alone or in combination with the frontal attack, Lord Roberts has gained his victories throughout this remarkable war, and has gained them as a rule with very slight loss to his men, though

doubtless with a high percentage of wastage amongst his horses. The mere approach of Ian Hamilton was sufficient to cause the enemy to retire from the fortified pass leading to Lydenburg, leaving the way clear for Buller's advance, and on the 6th inst. the British cavalry occupied the town, the main columns being then but five miles from it.

The Boer forces retired as our troops advanced, and divided, part going north with most of their guns and stores towards Kruger's Post, and part towards Spitzkop, a lofty, isolated hill, surrounded by mountains, twenty-five miles to the east. The latter portion, checking their retreat, took up a fresh position on a hill 1800 feet high, within cannon-shot of Lydenburg and commanding it, whence they were driven with loss on Saturday by General Lyttleton's Division and General Ian Hamilton's column, and forced to continue their retreat over the Mauch mountains to Spitzkop. In this action the 1st Batn. Royal Scots, 1st Batn. Devonshire Regt., and the 1st Batn. Royal Irish Fusiliers carried out the main attack on the enemy's front with great gallantry, a turning movement being impracticable. The steady demeanor on the occasion of the Volunteer Company 2d Batn. Gordon Highlanders, composed largely of members of the London Scottish, in the face of a heavy fire, which caused much loss in their ranks, was brought specially to notice by General Buller.

On Sunday, Buller, in active pursuit towards Spitzkop, crossed the Mauchberg ten miles east of Lydenburg, and became again engaged in a country of extreme difficulty, the roads being, as he reported, "too bad for description." Meanwhile General French, who had again passed to the south of the railway, left Carolina on Sunday with Dickson's and Gordon's Cavalry Brigades, Mahon's Mounted Infantry, two battalions of infantry, and 4.7-inch naval guns, and advanced towards Barberton. He was opposed throughout the entire march, but drove the enemy successively from three positions, one of which was taken with great dash by the 1st Batn. Suffolk Regiment. The column crossed the Komati River on Monday and was reported on Wednesday to have been heavily engaged again. General Hutton having reinforced Colonel Henry's Mounted Infantry, operating nearer to the railway, was engaged at the

same time in the difficult country about Waterval Onder, and General Pole-Carew, occupying with his infantry the central position as before, witnessed the fight from the hills to the north of the same place. Hutton by a rapid turning movement caused the enemy to abandon their strong position and to retire hastily. On Monday Buller, driving the routed Boers before him, was within ten miles of Spitzkop. He had captured *en route* many wagons containing food and ammunition, and fourteen had been thrown down a mountain precipice by the enemy, who despaired of getting them clear of their pursuers. On Tuesday this column occupied the junction of roads from east and south near Spitzkop, the enemy retiring, some to Nelspruit, and others north across the Sahie Drift. Hutton was then moving forward to reinforce French on the right, Ian Hamilton, passing through Helvetia, was due at Waterval Onder on Thursday, and Pole-Carew was moving on by Nooitgedacht to Godwaan Station. The entire front covered by the British advance, which has been slow owing to the difficulties of the country, has been little short of fifty miles.

Telegraphing on Thursday, from Machadodorp at 6.20 P.M., Lord Roberts announced that Sir Redvers Buller was comfortably settled in Spitzkop, where they found 300,000 lbs. weight of Boer supplies, principally rice, sugar, flour and coffee, and 300 boxes of Martini-Henry ammunition.

The war correspondent of a leading journal, telegraphing from Belfast on Monday, announced that at a council of war the Boer chiefs had definitely decided to make a formal declaration of guerrilla warfare. This need cause us no uneasiness. It would be in itself a confession of the complete defeat and disintegration of the organized Boer armies in the field. It would threaten nothing more than what is already in full operation in various districts throughout the Orange River and Vaal River Colonies and it would have the advantage of clearly defining the situation, and of concentrating the best energies of the Commander-in-chief and his generals to the thorough disarmament of the country, as Lord Roberts has indicated in the proclamation he issued on hearing of the departure of President Kruger and resignation of General Botha. The general situation is as follows: To the north of the Delagoa Railway

General Buller occupies Spitzkop. General Pole-Carew is advancing along the line, General Ian Hamilton to the north of it, and General French twenty miles to the south. In the south General Hunter is organizing a movement against the raiding commandoes known to be infesting the Ladybrand, Ficksburg, and Senekal districts, and the small British garrisons of those towns have been withdrawn to form part of his force. The western Transvaal has been traversed from Mafeking towards Lichtenburg, by Lord Methuen, who on Sunday attacked and dispersed a commando at Malopo Oog, capturing many prisoners, wagons, and much ammunition. Colonel Dalgety, at present commanding General Little's Cavalry Brigade, has experienced in the same district some severe fighting during several days, and suffered a rather heavy loss at Quaggafontein on the 7th inst., and General Douglas, in an action southeast of Ottoshoop on Tuesday, beat off an attack and captured stores. A Boer force some 4000 strong is still reported to be in the Zeerust district. In the southeast Transvaal General Hildyard, moving from the Natal Railway near Volksrust, occupied Wakkerstroom on the 5th, the Boers under Joshua Joubert retiring, and on Monday he forced the Langwacht Pass, making for Utrecht. General Clery advanced from Standerton on the 8th against a body of Boers threatening the line in his quarter. In the central Transvaal General Clements has been marching through the Pretoria district, where he was successfully engaged on Saturday with a force under Delarey near Kekepoort, between Krugersdorp and Rustenburg, while General Hart, operating to the southwest of Krugersdorp, has been clearing the vicinity of the railway there. Commandant Theron is now known to have fallen in one of the actions in this district. De Wet was believed to have joined Theron south of Johannesburg, and their combined force was stated to be 1800 strong, but to be without guns. The latest surmise, however, regarding De Wet is that he heads the guerrilla bands about Thaba 'Nchu.

With relentless energy the enemy's parties make descents at all points on the railways, firing into and derailing trains, and ripping up the rails. On the night of the 5th the engine of a train was destroyed by dynamite between Pretoria and Belfast, and the train derailed, and a span of a bridge has been de-

molished by the same means on the Krugersdorp line. The northern posts continue to be held by General Paget and Colonel Plumer, where they watch the bush-veldt now becoming too unhealthy to harbor the enemy much longer. For the same reason Warmbaths has been evacuated by Paget. Thus over the entire field the British forces are now widely dispersed, operating for the most part by almost independent divisions or brigades, and based on the railways, which are guarded by continuous chains of defensive posts. The chief requirement is still, as from the beginning, an almost unlimited supply of horsemen to confer on our flying columns the mobility necessary to hunt down, circumvent, and destroy the numerous bands of mounted guerrillas raiding the country. It is satisfactory to learn that between now and October 25 nearly 13,000 fresh horses will reach South Africa. That complete success will finally crown the efforts of Lord Roberts, there is now no reason to doubt, and the disappearance in flight of ex-President Kruger from the scene is an important step towards the desired end.

THE END OF THE WAR.

The important dispatch received on Thursday from Lord Roberts at Nelspruit virtually declared the end of the South African War to have come at last. Lord Roberts in his telegram depicted the break-up and dispersal of the remnant of the Boer army. Of the 3000 who retreated before our troops to Komati Poort about 700 have effaced themselves by crossing the Portuguese border, many have deserted, and the residue are on the spurs of the Lebombo mountains beyond the Komati River, south of the railway, and near the frontier. Here they are almost powerless for further mischief, and they will probably shortly follow their brothers in arms over the frontier, unless they elect to make there a final stand and receive the *coup de grâce*. Of the Boer artillery we learn that the enemy, in the tumult and desperation following the realization that their last hope of success was gone, destroyed most of their guns, both heavy and light. In consequence of this final and utter collapse, Lord Roberts affirmed that there was nothing left of the Boer army but a few marauding bands, and, according to report—still wanting official confirmation—the Com-

mander-in-chief, having accomplished his difficult task in an exceptionally brilliant manner, it is stated, in a telegram from Pretoria, will leave South Africa and his victorious army on an early date on return to England.

Concurrently with the efforts made by the Commander-in-chief to induce the burghers still hostile to lay down their arms and prevent further loss and destruction, the onward progress of the British columns has been pushed resistlessly eastwards with unrelaxed vigor. Lord Roberts on Tuesday had advanced his headquarters some fifty miles from Machadodorp to Nelspruit, a point about 110 miles east of Middleburg and sixty miles west of Komati Poort, the objective of the main column. Nelspruit was occupied without opposition on Monday by the 18th Brigade, commanded by Major-General Stephenson. General Pole-Carew, with the Guards Brigade of the same division, and General Ian Hamilton's column was, at the date of Lord Roberts' dispatch, four miles to the eastward of Avoca Station on the Barberton branch line, having struck across country from the Delagoa Railway, following an independent line of march towards Kaap Muiden Station, where he was due on Wednesday. The enemy, who for a short time checked the advance of his mounted infantry, retreated before him towards the east. Lord Roberts at Nelspruit was in telegraphic communication with Sir Redvers Buller, who, at Spitzkop, twenty-five miles to the north, covered the left flank of the main advance. From Nelspruit also he was able to send supplies to Buller's force with greater ease than from Machadodorp. Of General French's recent doings we await further news. On Monday it was known that the Inniskilling Dragoons, moving in advance of his force, had captured fifty locomotives at Avoca Station, a welcome addition to the forty-three taken by the same intrepid commander at Barberton on the 13th inst., when by a dashing forced march over the difficult mountain pass into the Barberton valley, he surprised the enemy holding the town, released twenty-three officers and fifty-nine men, British prisoners there, and captured over 100 Boers, with rolling stock, and food for three weeks for his men, besides many Mausers and much ammunition, with wagons, cattle, and sheep. He also intercepted large convoys arriving there, Barberton having

been a grand depot of supplies for the Boer forces in the district. Avoca is less than sixty miles from Komati Poort, and the news that French has reached that important point may arrive at any moment.

With the British in possession of Komati Poort—the frontier town of the Transvaal towards Lourenço Marques, the only seaport hitherto accessible to the Boers for procuring supplies—the last semblance of an excuse for prolonging even a guerrilla war should disappear. Having fought stubbornly and well for nearly twelve months against overwhelming odds, the scattered remnants of the burgher armies would, if guided by wisdom and prudence, accept a defeat that would bring with it no dishonor, and would allow the suffering peoples of the conquered States te return to a condition of undisturbed peace. But it is much to be feared that they are now feeling the ill-effects of the misguided zeal in their cause of the friends who, in Europe and in South Africa, were active in the early days of the war in enlisting foreign mercenaries, and in commandeering the colonial subjects of the queen. To these two classes alone in the rank of the enemy, irreconcilable and desperate men, is now attributed the desire and the determination to continue hostilities, by fair means or foul, to the bitter end. This view is borne out by a recent report received by Lord Roberts from Sir Redvers Buller at Spitzkop, to the effect that the bulk of those who opposed him were mercenaries and Cape Colony rebels. Should these trek into the mountainous regions of the Zoutpansberg, beyond the Olifants River, fresh work of a very arduous kind will be in store for our troops.

Desultory fighting on a small scale in many places with uniform success to the British, and many large and important captures by them, form the staple of the news from other parts of the field. General Rundle is again at Bethlehem with General Boyes' Brigade, and a patrol of the Derbyshire Yeomanry there had lately an encounter in which the commanding officer, Lieut. Power, gained much credit. Lord Roberts in his despatch of Wednesday stated that Rundle, acting from Bronkhorstfontein, had attacked a marauding band in position about ten miles to the southwest at Doornberg on the Zand River, and captured one gun and over thirty wagons. General Hart was

moving successfully against another of these bands near Potchefstroom. The re-occupation of that town by his force on the 11th inst., was a smart affair. After a forced march, in which his mounted troops covered forty-five miles and his infantry thirty-five "straight off," he surprised the Boer garrison and took most of them prisoners. General Clements, west of Pretoria, drove Delarey's commando to the north of the Megaliesberg on the 12th, and on Tuesday he had a skirmish with a party near Heckspoort. General W. Knox, commanding at Kroonstad, came across some of the retreating Boers at Klompje Doorns. General Barton has been clearing the country round Krugersdorp; General Bradley has been similarly employed near Heidelberg; and General Hunter has been preparing a concerted movement against the commando reported to be near Mequatling's Nek. General Macdonald has not been idle, having had a smart affair with a party of Boers who made a raid recently on the line near Brandfort. Moving from Winburg, Macdonald, on the morning of the 13th, attacked the enemy when crossing the Vet River near Tafel Kop, on the Winburg-Bloemfontein road, driving them northwards and capturing some prisoners with many wagons and much ammunition and general stores. In the southeast Transvaal General Hildyard, advancing towards Vryheid, has established a post at Droetvlei, sixteen miles southeast of Utrecht, where he met with very slight opposition. In the far west, a small British garrison holding Schweizer Reneke, not far from Vryburg, was recently surrounded and threatened with capture, but was relieved, and Buttfontein, in the west of the Orange River Colony, was attacked on Saturday by a very superior force, which was constantly repulsed until relief came from Brandfort. General Douglas also was fighting near Lichtenburg on the 12th, and made large captures. It will be apparent from the above record of general activity in many quarters, widely apart, that there is still much arduous work for the various generals commanding the columns engaged in crushing the marauding bands that infest the country.

THE ENGLISH GENIUS AND ARMY ORGANIZATION.

By the late General Sir GEORGE CHESNEY, R.E., K.C.B., etc.

A lecture delivered at the Royal United Service Institution, March 27th, 1874.

Field-Marshal H.R.H. the Duke of Cambridge, K.G., etc., in the Chair.

(*From the Journal of the Royal United Service Institution.*)

MAY it please your Royal Highness, Ladies, and Gentlemen,—I feel as if an apology were due to this distinguished company, containing, as it must do, a large number of persons whose practical experience and professional knowledge far exceed mine, in venturing to come before you with a proposal of the kind indicated by the title of my lecture; but I may explain at once that I am not going to trespass upon your attention by putting forth any definite or precise scheme for army organization. Such schemes have, I believe, on more than one occasion been the subject of discussion in this theatre; and it has struck me that, however intrinsically excellent they may have been, they labored under the defect of being a little unsuited to the practical condition of the case. In a country where the army establishments are voted year by year, and where the strength of those establishments is liable to fluctuation almost from day to day with the varying current of public opinion, it surely becomes a useless, not to say pedantic, occupation to build up fanciful schemes on paper for regularly organized army corps, or anything else after the Continental system, when there is not the smallest likelihood of their being ever carried out. That the English military establishments are maintained on this uncertain footing may be a good or a bad thing for the country, but this at least appears certain, that the strength of the army is dependent ultimately on the state of public feeling; and, in the present temper of the country, any notion of emulating the gigantic and methodical organizations of Continental States is, of course, not to be entertained for a moment. Should any great crisis arise in the fortunes of the nation, then, no doubt, the nation would be found equal to any degree of effort and sacrifice; but for the present, in our existing happy state of peace and prosperity, the limits within

which the question of army organization may profitably be regarded are comparatively restricted. But within these limits there is to be found, I venture to think, the means whereby, without departing from the sober moderate line of conduct which is in harmony with English sentiment, the relative importance of English armaments, and the relative might of English arms, may be made susceptible of increase in an extraordinary degree. Yet, in endeavoring to explain the reasons on which that opinion is based, I feel very strongly that I may not be able to do full justice to the subject, if only from the inadequacy of the time available. In the few observations, therefore, that I shall venture to submit, I cannot attempt to do more than to put forward what, to use an expression with which we are all familiar, may be termed a "general idea," the development of which, however, if it is found to be worth anything, may safely be left to other and more competent persons to work out.

I have said, Sir, that in the present temper of the country, large armaments, in the sense in which the term is understood by Continental nations, are not to be thought of. And it will, perhaps, be said by many, that the question whether large armaments are necessary is becoming every day less of a practical nature, for that the policy of the nation is distinctly assuming a more pacific character. However that may be, this, at least, I take to be true: the national feeling may be more pacific in one sense, so far that it is disposed to contract the circle of issues for which the nation would be prepared to go to war; possibly a greater amount of provocation might be necessary now than would have been required 70 years ago to compel it to resort to the arbitrament of arms; but I think everyone will agree that there is no symptom whatever that the nation would be satisfied, if it should ever be compelled to go to war, to enter upon that war in the attitude of a second-rate power. The sense of national dignity, we may venture to assert, is as high now as it was in the days of Chatham and Pitt. If England is to go to war at all, it must be as a first-class power.

But it is very important to observe, that accompanying that proud sense of what was expected of them by their countrymen, which animated the Parliaments and the Ministers who carried on the great struggle of the Revolutionary War, and enabled

them, notwithstanding the blunders and shortcoming which marked the course of our military measures in those days, to bring the struggle to a successful issue—although the aims of our rulers were lofty and their courage never failed them, their conceptions of the proper course to pursue, and their actual execution of measures for giving effect to it, always fell woefully short of the required standard. The intentions were excellent, but the execution was feeble. England always intended to fulfil the rôle of a first-class power, only she never seemed to know how to set about doing it. Indeed, it cannot be said that, since the days of Marlborough, England has ever actually played the part of a first-class military power. I am speaking, of course, of military, not of naval operations. Even in Marlborough's days, indeed, the actual force of English troops was inconsiderable; the strength of his army, as everyone knows, was eked out with allies; still the English as represented by Marlborough's army, were opposed throughout the war conducted by him to the main body of our adversary's troops, and did not operate, as has usually been the case since, on secondary lines and as a diversion to distract the enemy from the principal theatre of war. The military genius of the great Chatham, on the other hand, vigorous and able though it was, still was dissipated over isolated enterprises in distant parts of the globe—in North America, in West Indian islands, in India; the assistance given to our ally of Prussia in his dire distress was never more than inconsiderable, although it was after all on the Continent that the struggle had to be settled. And the want of appreciation of the true principles of making war, manifested by Chatham's illustrious son, has, been sufficiently commented on by a great writer. During Pitt's long administration, England was a first-class power only at sea; our military enterprises regarded as means for putting an end to a tremendous war were simply contemptible, and for the most part failed signally, as they deserved to do. And if a giant like Pitt came short of appreciating the true principles of conducting war, far less was it to be expected that the men who on his death wrapped themselves in fragments of his mantle would display any better knowledge of the matter. In the "Life of Perceval," just published, you will find an interesting and amusing episode which

bears on this point, wherein Mr. Perceval, who was Prime Minister and Chancellor of the Exchequer from 1807 to 1812, takes the Duke of Wellington, then just created a peer for Talavera, to task for spending more than the three millions which the Chancellor had provided as the annual sum available for carrying on the Peninsular War with. "How extremely irregular," says Mr. Perceval, writing to the Duke in 1810—"how extremely irregular, when I have so many other expenses to meet, to draw a larger bill on me than I had agreed to accept!" And when Lord Wellington replies that he is very sorry to have incurred his displeasure, but that he really did not spend more money than he could help, the Prime Minister writes in effect: —"I don't mean to say that I am exactly angry with you, only you must not do it again; and it is perhaps just as well that you did not report the irregularity beforehand, for if I had known that the war was going to cost five millions a year instead of three millions, I should certainly have withdrawn you and your army from Spain altogether." Thus we see among other things how times have changed; for assuredly a Chancellor of the Exchequer at the present day would think himself very lucky to get out of any war at all at the rate of five millions a year, to say nothing of a big one. Mr. Perceval evidently regarded the service of the war as a thing to be provided for by a periodical assignment, after all other expenses had been met, much as a private gentleman might set aside a fixed sum every year for the expenses of his hunting stable or his yacht. Well, after Mr. Perceval's death, Lord Wellesley was invited to take the head of the Government, and he endeavored to obtain the coöperation of Lords Grey and Grenville, with a view of forming a strong united administration out of the two great parties. Lord Wellesley, I need not say, was the Duke of Wellington's eldest brother, who had returned from India not many years before, after a very brilliant career, and was perhaps the one man of his time who understood how war ought to be carried on. When he got to India, he at once put an end to the pottering, half-hearted way in which it had been usual to conduct wars out there before his time; he organized our forces on a scale commensurate with the object in view, put able commanders at the head of them, and swept our enemies away, and in

fact made the British Empire very much what it is, as regards extent and supremacy, at the present day. Well, when Lord Wellesley came home, he at once saw that we were carrying on the great war—a great war as regards our share in it only so far that we took a great time over it—in a very dawdling fashion; and he made it a condition of assuming the head of affairs that a great increase of vigor should be imported into the matter, and especially that the army under his brother in Spain should be largely strengthened. Lords Grey and Grenville, however, did not see it; in their view the war was being carried on with as much vigor as the resources of the country would admit of. The negotiations were broken off, and Lord Wellesley's Government, as it happened, was never formed; but the correspondence brings to light the popular view in those days—not indeed the popular view only, but the view taken by statesmen as well—on this head, which seems to have been that 30,000 soldiers was a good round number for a nation to go to work with; a good deal of fighting might be got out of 30,000 men if you only kept at it long enough—and by going on for a few years, perhaps in the end something or other would turn up. It is true that the Duke of Wellington is reported to have said that he always received the fullest support from the Government of the day, and that if he had been supplied with more men in the Peninsula he should not have known what to do with them; but then anything like a boast or insinuation that he could have done more if he had had more means, would have been utterly opposed to the Duke's character; at any rate, there can be no doubt of the waste of the Walcheren Expedition; and every reader of Napier's History will remember his lamentation over the diversion of a large force to Holland under Graham towards the end of the war in 1813—a large body of men utterly thrown away, but which, if they had been added to Wellington's army, would have enabled him to get to Paris as soon as the Allies, instead of finishing off at Toulouse.

Well, but perhaps it may be said, all this is very true, but what has that to do with us? We are wiser in our generation. We know better nowadays. If one principle is more clearly established than another, it is that wars, if they are undertaken

at all, must be short wars; we have no intention of repeating the mistakes of former generations. Excellent, however, although our sentiments may now be on this head, is it the case that our practice has improved with them? On the contrary, if we were unhappily ever drawn again into a Continental war, is there not great danger of similar mistakes being made again, and in even an exaggerated degree? True, they might not reappear in precisely the same form. No doubt the necessity would be felt for making a much more vigorous and immediate effort, and in one sense such a war would certainly be short, because our antagonist would unquestionably take care that it should not be a long one; but so far as preparation goes, is there any evidence that we should have the means any more than we had sixty years ago of meeting any first-class military power on equal terms? Is it not quite clear that even supposing the nation felt called upon to make a supreme effort, and to go into war on a large scale, that almost everything would have to be improvised for carrying out such a policy? We have, it is true, the nucleus on which a large army might be formed, if sufficient time were allowed, but sufficient time is just what assuredly would not be available. I am speaking here of course of offensive war. For defensive purposes our position has no doubt been vastly strengthened of late years, and I for one venture to believe that as we now stand, a successful invasion of England has been placed beyond the category of possible events. But for offensive war we are really no better off than ever we were—rather we have fallen behind, because the scale on which warfare is conducted has become so enormously extended. Some persons, indeed, may be disposed to deny this assertion, and to cite what has been done of late years towards strengthening our field artillery, concentrating line battalions at home, establishing a reserve, and so forth, as showing that we have kept pace with other nations, and so amounting to a refutation of my assertion. And we may recollect a discussion carried on lately in the columns of a leading newspaper, when those who argued on one side, including the leading newspaper itself, showed that whereas the effective strength of the army—that is, the strength available for taking the field after providing for depots and reserves and so forth—used not until lately to exceed 30,000 men

or thereabouts, we could now send forth at least 60,000 men, with field artillery and cavalry in due proportion, and that therefore the military situation was in fact very complete and satisfactory. But admitting the facts, do they not convincingly prove the case contended for? When the forces of continental nations are mustered no longer by regiments or divisions, or even army corps, but actually by armies within armies, and when their numbers are no longer counted by thousands, but almost by millions, what, I ask, does it really matter whether England could send into the field two army corps instead of one army corps, to contend against the 15, or 16, or 18 army corps which any one nation would bring against it? Is it not manifest, considered in this light, that the new establishment is practically just as insignificant as the old? That the sort of army in point of numbers that would be needed in case of a war has in fact still to be created, and that in the absence of any distinct scheme provided beforehand for creating such a force, with which to take a place adequate to the magnitude of the interest at stake and the spirit of the people, the outbreak of war would give rise to the same state of unreadiness and hurry-scurry that has been so often witnessed before, and that, failing recruits of our own, we should be casting about for recruits among the pauper communities of Europe wherever they could be found, and raising Turkish contingents, or German legions, or Spanish auxiliaries, perhaps even Ashantee levies—flesh and blood in some form wherever it could be found for our officers to lead, and to be got into shape for active service just about the time when the war was coming to an end, and they were no longer wanted.

Is there anyone, I ask, who does not feel, if he thinks about it at all, that this is what would certainly happen in such a case? And is this a satisfactory outlook? Are we always to be taken by surprise in this fashion? And there is another point to be considered, that although our military organization has thus stood still relatively, public opinion has undergone a great advance. Time was, as I have already observed, when even the rulers of the nation thought it a sufficient and satisfactory mode of making war to keep up 30,000 men or so on the scene of action, year after year, until something turned up, and

national opinion was not educated in advance of the point reached by its rulers. But nowadays nobody either in or out of Parliament would be satisfied with making war in this pottering, lackadaisical fashion. The very fact that the country is so much more peaceably disposed than it used to be, and that it would not allow itself to be drawn into a quarrel except under grave provocation, indicates that if ever we do have to resort to arms, it will be for the maintenance of some great principle, to avenge some great wrong, to take a part in some momentous struggle, calling for a supreme effort. Suppose, then, such an occasion to arise; suppose the British lion to be at last aroused even beyond the point of roaring, just think what would be the feeling of the nation—its mortification, its rage, and indignation—to find that the whole army could not suffice to do more than operate as a weak contingent on the flank of the German, or Russian, or French, or Italian army, as the case might be; perhaps even as a contingent of the Belgian army; or, if we are fighting on our own account, to find that the British army was just strong enough to hold its own, intrenched in some corner of Europe, while the real issue was being fought out in a distant battle-field. That would not be a very dignified, proud, or very useful part for a great power to play; and yet can any military man, or any other man, say that any other result is to be expected? That is, at any rate, the view which able continental strategists take of the situation, when they conclude that English troops may for practical purposes be disregarded in political forecasts; and it is one which the British nation, if the situation were realized, would assuredly accept only with shame and indignation.

Well, then, after this jeremiad as to the awful consequences of neglecting to place ourselves on an equality with other nations, perhaps it may be expected that I am coming forward to propose what at first sight might appear to be the only other alternative. You are evidently, it may be said, a disciple of the bloated armament school; you go in for a conscription, enforced service, a large standing army, and all the rest of it? I reply that I propose nothing of the sort. And here, since I am sensible that my lecture, so far, may be thought to bear a warlike, not to say pugnacious, aspect, I would take the liberty

of making the confession—a bold one, perhaps, to venture upon in the present company—that I regard war as at best a brutal occupation. For success in war is not found arrayed on the side of right and justice, but on that of might and cunning. If you happen to possess the cleverest general of the time, and to have made the most careful preparation, then you may hope to have the God of battles on your side too, but not otherwise. If, too, war develops some noble qualities, it also develops some very ignoble ones; while that desire, so often evinced and so much commended—the desire to see service—is it not traceable at bottom to a small feeling of personal vanity? So much by way of disclaimer, and lest it should be thought I am advocating a policy unsuited to the pacific tendency of the times. But although we may feel a moral disapprobation for the profession of the garotter or the burglar, there is no reason why we should allow our house to be broken into, or our teeth to be knocked down our peaceful throats. War, like the gout or the toothache, or many of the other ills of humanity, is not to be got rid of merely by disliking it; and if, unhappily, we should ever have to go to war, a vigorous offensive may prove the best defense. And the question is whether there is really no alternative between the bloated armaments, conscriptions. and all the rest of it, and political effacement. I venture to think that there is; and that just as the happy situation of our sea-girt isle procures us immunity from attack within, so there may be found in the national character and genius the means whereby we may be able to exert a successful influence in the cause of right abroad, without imitating or emulating the military systems of foreign nations. This, then, is the question which I am now going to submit for your consideration, premising, as before, that the limits of time available will not permit of my putting forth more than a general idea, for abler and better informed men to develop, if it is worth anything, into useful shape.

In the first place, then, I would observe, that if it be asked what are the characteristics which specially distinguish our fellow-countrymen from the other nations of Europe, the ready and true reply would be, that Englishmen are distinguished by their love of freedom, their aptitude for self-government, their

energetic temperament, their readiness of resource, and their faculty of invention. No doubt if the picture were drawn by a foreign artist, the colors would probably not be laid on quite so thickly as in the portrait of the British lion painted by one of the species; still, without undue vanity, we may venture to lay claim to these qualities. No other nation has manifested so much independence and originality in political life, so much energy and aptitude for commerce and colonization, so much inventiveness in the arts, as witness what has been done in railroads, telegraphs and manufactures of all kinds. It is true that we find across the Atlantic a yet more striking development of these qualities; but, as regards the nations of Europe, we may fairly claim to have taken the lead so far in these matters, whatever may be the case in the future. The same thing holds good as regards maritime affairs, not only in the arts of peace, but in the arts of war. It is the English who have discovered or worked out almost all the improvements of late years in the construction and armament of ships of war, other nations being usually content to adopt our patterns, just as we are beginning to discard them in favor of something else.

But on the other hand, while we have thus led the way in these things, our military policy has been essentially imitative. Every part of our military organization—the equipment, the drill, the armament, even the clothing—everything is borrowed from some or other of the continental armies. We have been content to follow instead of showing the lead. It is the same in small things as well as great. They arm with breech-loaders; we do the same. The French, the first military nation, put leather round the edge of their trousers; we follow suit. The Germans are victorious, and wear their trousers tucked into their boots; we discard the leather edging for boots accordingly. So with regard to almost everything else. We may produce better guns, and turn out stronger harness than other nations, but the ideas which underlie these things are borrowed in the first instance. So is our organization by regiments, and brigades, and divisions, and army corps. The only point in which we display any originality is in our omission to supply the rank and file—we imitate them in everything but that.

But next, look at the reduction which I may term the im-

itative or convenient mode of organization causes in that part of it which is already in our small army, weakest, the strength of our fighting men, or rank and file, owing to their withdrawal for all kinds of services, as servants, batmen, and what not, which goes on in war-time, over and above the same reductions as occur in peace-time, for guards of all kinds, men under punishment, and so forth. The assumed untrustworthiness of the private soldier—and the whole theory of the Regulations assumes that he is untrustworthy—is the cause of the loss in the nominal strength of effective soldiers. If a cask of rum has to be sent from one station to another, there must be a corporal's guard sent with it. The theory of the service is, that the private soldier can never be trusted to go anywhere or do anything by himself. He is always in charge of a non-commissioned officer. But I need not enlarge on this point in such company. Every regimental officer knows how great is the difference between the nominal and the effective strength of any body of troops. And the reduction, be it observed, is not so much in the upper ranks or the staff; it is the rank and file which dwindles away.

But the great loss is from sickness. Here, too, again in the men. It is not, as a rule, the officers who suffer in the great epidemics in India; the effect of these terrible outbursts is usually confined to the men; the officers for the most part get off lightly. They know, for one thing, how to take care of themselves, and the men do not. And this loss goes on with still greater rapidity in war-time, both because the stress of war on the health is heavier, and because the exigencies of war compel greater laxity in the choice of recruits; a lower and less healthy stratum has to be tapped. Everyone will remember the published request of Lord Raglan in the Crimea, that more recruits should not be sent out, because they were swept away like flies as fast as they arrived. Observe, too, that in the withdrawal of men for various extra duties, the choice is mostly determined by the roster, without reference to the relative fitness of the men for their different duties. The best shot or the strongest man may be left behind to guard some stores just before the battle, while the puny recruit is sent to the front.

Well, then, it being evident that England is always destined

to act with a small army, that in all armies as now organized there must be a great reduction of the nominal strength from non-effectives, and that this reduction tells much more upon an army which is already weak in rank and file,—how would it do to strike out an entirely new line for ourselves, to give up hankering after numerical strength, and to go in boldly on new lines of our own with a new sort of army, in which quality should atone for lack of quantity, and thus to attempt a complete revolution in the art of war, as we have already effected a revolution in so many of the arts of peace? We do something of the kind in India even now. There, although we have an unlimited material for soldiers available, we import a limited number of soldiers of a special and very costly kind, white men among dark; and, having got them there, we keep them specially for fighting. There are no non-effectives among the British troops in India; the duties outside the actual fighting are relegated to a less valuable agency; and every European soldier—except the sick—is to be found in his place in the line of battle. How would it do, then, to aim at the same sort of thing here? To have a small army, but in which not only should every soldier be effective for the actual business of fighting, but every soldier should be as superior to the ordinary conscript of Europe as the British soldier in India is to the ordinary sepoy of a native chief? An army of really picked men—for, remember it is not until you go above the lowest social stratum that you come to the typical Englishman, the sturdy, well-fed, representative Englishman—men self-reliant, intelligent, fit to take care of themselves; an army in which guards, and cells, and punishments would be unnecessary, but in which even a stronger discipline could be maintained than is possible now, just as higher discipline can be exacted from officers than from privates, because a sense of duty and honor acts, and not only a sense of fear—an army from which it should be a punishment and a disgrace to be dismissed. With such an army as this, might not Great Britain effect a revolution in modern European warfare, just as she has effected a revolution in Eastern warfare, by making skill and originality atone for the want of numbers?

But now, it will be asked, how do you propose to set about

this change? Skill and courage may be all very well, but a bullet will go through a man's head without any reference to the quantity of brains inside it, or to his girth round the chest. Numbers must tell, whether of infantry against infantry, or cavalry against cavalry. If your small army comes in contact with one of the huge continental armies, it is to be feared that, your picked troops notwithstanding, providence will still be found on the side of large battalions. But, perhaps it may be said, you mean to propose an army composed wholly of artillery, or of *mitrailleuses*, or—on the principle that there is nothing like leather—an army of engineers to advance irresistibly behind a rampart of earthworks, as the soldiers of the Grecian phalanx did behind their big shields. I am not, however, going to propose either the one or the other. The army of the future, in my view, should be an army of horsemen, not merely cavalry or mounted riflemen, but men trained to the highest degree of excellence in either line; men who should be to other soldiers what the knights of old were to the ordinary men-at-arms—a body quite irresistible; which would sweep away any cavalry of the kind that is commonly to be found in armies, and which, able to move and operate with great rapidity in any direction, would be equally beyond overthrow by any infantry that could be brought against it.

Imagine a force of this sort, of say only 30,000 men, landing anywhere on the continent, under a bold leader; what is to prevent it from marching from one end of Europe to the other? The enemy's cavalry could not stop it; our force would want nothing better, indeed, than that there should be an opportunity of meeting it and crushing it; but practically, after a little experience of such a foe, the enemy's cavalry would not keep the field. Yes, it may be said, but there still remains the infantry, and what is to be done against their overwhelming numbers? Well, no doubt, a body of 300,000 or 200,000, or even 100,000 men, occupying a line of country or a line of battle, forms a very imposing force, and has an advantage over a smaller army opposed to it, provided, that is, that the smaller force plays their game, advancing or retreating on the same front, and so being everywhere at a disadvantage. But our army of the future—our British knights—would, of course, do nothing of

the sort. They would be able to concentrate and cut through the opposing army at any point, but they would naturally gain a flank, and operate on it, which their power of quick movement would enable them to do. A part of the force being dismounted for the occasion, would attack and drive back the extreme flank of the enemy's line, and this body thrown into confusion, our reserve would come up and join in the pursuit, driving back the beaten enemy across and upon their own line. And the pursuers being once mixed up with the pursued, the latter's wealth of guns and musketry becomes of no avail. They cannot fire upon their own troops. Attacked in this way, large armies might cease to be formidable. If you allow the assumption that the English nation could furnish such a force as I have been describing, and if it be admitted as a further consequence that such a force, by its rapidity of movement, would be able to take the initiative at any point of the enemy's line, and could also be superior to the enemy at any one point, then might it not be possible to roll up the largest of armies of modern times, just as Frederick rolled up the Austrian line at Leuthen? After the first impact, the loss would be small. Artillery and even infantry fire require the object to be at a certain interval to be harmful. It is true this mode of attack is, in one sense, the sort that is practiced now, the usual object being to gain the enemy's flank, and roll back his line upon itself; but then it is seldom possible to execute this manœuvre completely, because the one side has not the means of moving faster than the other, and, besides, the need is always recognized of covering your own communications, which interferes to prevent such a manœuvre being attended with decided results. But I assume that in this case you would strike boldly, without any regard to keeping your own rear open, on the principle that the confusion caused to the enemy by cutting in upon his communications would far more than compensate for the inconvenience of losing hold of your own for a time. And imagine, indeed, what would be the effect of 30,000 or 40,000 horsemen—horsemen fit to act together, or fit to act alone—men able to ride across country, across any country—in Europe, riding to and fro in rear of an army, intercepting its communications, cutting off its supplies,

destroying its reserve, ammunition, and material, creating confusion and panic far and wide. Is it not clear that the larger the enemy's army, the greater would be its resulting confusion and disorganization? Such a mode of attack, carried out boldly and without fear of consequences or regard to conventional rule, would, I believe, utterly cripple and confound an opposing army of vastly larger size. 30,000 men in this way might hold in check 300,000.

This, then, is the general idea which I have to offer for consideration, a humble contribution towards the subject which is and has been occupying so many active minds, an idea suggested partly by what happened in the great American war, partly from what has been already put forward by others. Time does not admit of my endeavoring to elucidate the various points which need it, or of replying by anticipation to the various objections that might be brought against such a scheme—and I think it would not be difficult to name a few. I would observe, however, that I do not suppose the creation of this new force would obviate the necessity for infantry, or artillery, or engineers; only—and here is the main point—instead of these horsemen being merely a subsidiary body, that the other branches would act in offensive warfare as auxiliaries to the fighting first line, composed of these, our irresistible horsemen.

One word as to cost. If service in the army, or, at any rate, this branch of it, is to be prized and sought after, there must be a complete revolution in the work of recruiting and the scale of pay. But this is not really an alarming prospect. Even in peace-time the actual pay of troops is not the main element of cost, and in time of war it becomes perfectly insignificant. The Crimean War cost, I believe, eighty millions sterling, out of which the pay of the soldiers was a mere trifle; and if by paying each man five or six shillings a more robust article had been obtained, and the casualties from sickness thereby reduced in any considerable degree, the money would have been saved over and over again.

It may be objected, perhaps, what is to prevent other nations from possessing themselves of our secret? Should they do so, should they attempt to adopt our system, then, not to say that this would be the strongest possible testimony to its merits,

could we ask anything better than that our adversaries should meet us on our own terms, and in the mode of warfare which we have deliberately adopted as that best suited to our national genius? Can any Englishman doubt what the result would be? But it is more likely that they will stick to their conscriptions and their big muster-rolls, and give us, should war unhappily arise, the opportunity of repeating once more the experiment so often tried before, so often in India, and now, lastly, in Africa, of pitting skill and resolution against numbers. Should that day come, and those of us at home, when viewing in the mind's eye the odds opposed to their countrymen in the field, be led to cry, in the words of one of England's greatest monarchs on a like occasion:

> "O God of battles, steel my soldiers' hearts:
> Possess them not with fear: take from them now
> The sense of reckoning, if th' opposed numbers
> Pluck their hearts from them!"

then will those gallant men reply—men not in the desperate case of the heroes of Agincourt, of whom their antagonists said scornfully:

> "Yond' island carrions, desperate of their bones,
> Ill-favour'dly become the morning field:
> * * * * * *
> Big Mars seems bankrupt in their beggar'd host.
> * * * * * *
> The horsemen sit like fixed candlesticks,
> With torch staves in their hand; and the poor jades
> Lob down their heads, dropping the hides and hips"—

not men and horses in this doleful plight, but the cream of British manhood mounted as they could and should be mounted, —then may each man of the gallant host reply in his heart, in the words of the same heroic king:

> "The fewer men, the greater share of honour.
> * * * * * *
> No, 'faith, my friends, wish not a man from England.
> God's peace! I would not lose so great an honour,
> As one more man, methinks, would share from me,
> For the best hope I hope"—

and so saying, ride on to victory.

FILTRATION OF WATER FOR PUBLIC USE.

AN INFORMAL DISCUSSION AT THE ANNUAL CONVENTION, JULY 3D AND 5TH, 1900.

(*From the Proceedings of the American Society of Civil Engineers.*)

SUBJECT FOR DISCUSSION.

"The several Processes now used for the Removal of Objectionable Matter; their Comparative Sanitary Effect, Cost and Reliability."

GEORGE W. FULLER, Assoc. M. Am. Soc. C. E.:—For the engineer who has to consider water filtration problems in different parts of America, the speaker thinks there is no point more deeply impressed on his mind than that the waters from different sections of the country possess to a large degree a distinct individuality in reference to their purification. Having listened to the excellent *résumé* of this topic by Mr. Hering, the description of the Warsaw filters by Mr. Lindley, and the discussion on English practice by Mr. Deacon, it is thought that it would be of interest to look at the subject for a few moments from the standpoint of the applicability of different methods of purification to different types of water.

One of the fundamental principles of water purification, as viewed from experience in America, is that the quality and the composition of the water to be filtered are factors of prime importance. This is particularly so with American surface waters, where there are wide ranges in character. In this discussion consideration is given only to surface waters, and not to ground-waters which may need treatment for the removal of iron. With the surface waters from different sections of the country, the most variable features, from the purification standpoint, are with reference to turbidity and color. By turbidity is meant the sand, silt, clay and those matters of an amorphous and organic nature which are contained in the water in suspension; and by color is meant the vegetable matter which is dissolved in the water, and which gives what is called by many a vegetable stain.

In the original application of water purification, improvement in the appearance of the water was, of course, the object sought. Within the last fifteen or twenty years the problem

has changed, as is well known, and, fundamentally, the object now to be secured is the removal of those bacteria which are associated with the causation of disease. In looking at the problem from that point of view, it may be of interest to point out a difference which occurs between conditions in America and in Europe.

In Europe, particularly in England and in the western portion of the Continent, or, more accurately, with those filtered waters with which American engineers are more familiar, the speaker understands that it is generally true that if the water is filtered so as to eliminate the bacteria, the appearance of the water is satisfactory. That is to say, if the effluent is satisfactory from a hygienic standpoint, it is not necessary to give attention to the appearance of the filtered water. But in America the reverse of this would be true in numerous instances. In many places—not in the northeastern portion of the country, but in the south and central west—the character of the waters is such that if the water after filtration is satisfactory in appearance, it is also substantially free from bacteria. This shows, in a general way, a difference, which perhaps is seldom appreciated, in the conditions in America and in Europe. The reason for this, of course, is that the clay particles found in the southern and western waters of America are much smaller in size than the bacteria. It is a fact that many of the clay particles in these waters are not more than 0.000011 in. in average diameter, or about one-tenth the size of the ordinary bacterium. Some of the clay particles are still smaller, and, without doubt, our estimates of their size are much limited by the present facilities for measurement under the microscope.

While a filtered water, of course, should primarily be as free of bacteria as is practicable, it appears to the speaker that the appearance of the water should also be satisfactory, in order to fulfill requirements as found in many cases. In this connection, it is to be borne in mind that many water consumers judge the character of a water by its appearance; and, regardless of the hygienic side of the question, do not look with especial favor upon a water which is either turbid or colored to a considerable degree. Public opinion in America appears to be undergoing a gradual but distinct

change in this respect. Colored and turbid waters which seemed to be acceptable a few years ago are now complained of in many instances; and, in the opinion of the speaker, the development of the "spring water" trade and of house filters, is suggestive of conditions which water-works engineers must consider in the near future.

When turbid waters in America are to be purified for hygienic reasons, it seems to be the consensus of opinion that the purification works should yield an effluent which is also practically free from turbidity at all times. With waters containing much vegetable stain opinion varies widely. In fact, in America it would seem that the amount of permissible (dissolved) color in a first-class water is one of the most unsettled points at present, in connection with water supply and water purification. The permissible limit depends, of course, to a large degree, upon the point of view of the observer. Perhaps the most critical observers at present in America are the water consumers themselves, who judge the appearance of the water in bulk with a white background as they see it on their tables and in porcelain-lined bath tubs.

To decide, in a conservative and reasonable manner, upon the permissible amount of dissolved color in water for the future requirements in America is a task which is as difficult as it is desirable. So far as the speaker has been able to form a judgment upon this matter, he would be inclined to place the limit at 0.30 part of dissolved color by the platinum-cobalt standard. This amount of color is about half of that frequently seen in many waters in the eastern part of America, and about double the amount found in the southern and western waters after the removal of the suspended silt and clay.

Returning now to the character of the American waters, it may be said, in a general way, that there are three types, as viewed from the present standpoint of purification. There is, first, the water from those comparatively short rivers, and from lakes and ponds, which lie within the glacial drift formation, that is, the waters best known to us as those of New England and the northern Atlantic States. There is also another very distinct type of water which lies south of the glacial drift formation almost entirely, that is, the large rivers lying south of

and including the Potomac, the Ohio, the Missouri, and extending from the Atlantic Ocean west to the Rocky Mountains. Between these types there is an intermediate class resembling in a measure the two; such waters as are found in the Delaware, the Susquehanna, the Allegheny, and rivers which lie along the dividing line between the drift formation and the section of country where the drift is absent.

To attempt to make specific comparisons of these types of water is a very difficult matter at the present time. In the first place, the amount of analytical evidence, with few exceptions, is very meagre indeed, and especially with reference to results from samples which represent the normal and maximum conditions that the engineer must consider in the design of purification works. There is also another reason why these data are somewhat wanting in the significance they carry, and that is the lack of uniformity in the analytical methods used in obtaining the results. This latter point is becoming realized more and more clearly by engineers, and also by the analysts themselves. In passing, it may be of interest to state that an effort is being made to correct this state of affairs. At the last meeting of the American Public Health Association a section of Chemistry and Bacteriology was formed, and there was appointed under that section a standing committee to consider the question of standard uniform methods of water analysis. Ultimately, it is hoped that some good may come of this.

Comparing with each other these general types of American surface waters in regard to the turbidity, or suspended matters which they contain, it may be said that those bodies of water lying wholly in the area of the glacial drift formation, such waters as that of the Merrimac, Connecticut, Hudson and Passaic rivers, carry from about 5 to 15 parts per million of suspended matters as an annual average. This quantity is greatly exceeded at times of heavy floods, and in the case of the Merrimac River the amount of suspended matter has been known to exceed 1000 parts per million. The conditions of the spring freshet in this instance, however, were abnormal. With regard to the character of the turbidity in this type of water, it may be stated that, comparatively speaking, it is caused by fine silt, and not by clay. Accordingly, it is a type of water which is

not very troublesome in its purification, as the silt can be removed quite readily by subsidence.

The waters of the second class, those of the South and West, contain very large amounts of suspended matter. The annual average amounts in the Ohio River water have been found to be 230 and 350 parts per million at Cincinnati and Louisville, respectively. In the case of the Mississippi River water there are records showing the annual average amount of suspended matter at St. Louis to be about 1000 parts per million, and about 560 parts at New Orleans. These records cover information obtained at different times during the past fifty years, and are by no means strictly comparable with each other. They are sufficient, however, to show that this general type of water contains roughly from twenty-five to fifty times as much suspended matter, on an average, as do the waters of the northern Atlantic seaboard in America, and also the English river waters as the latter are known to American engineers. From a practical purification standpoint the comparative difficulty in handling the very turbid river waters of the south and west is by no means adequately shown by the annual average amounts of suspended matter. There are several reasons for this. In the first place, the flood periods continue uninterruptedly for many weeks, and, in some instances, extend over several months, during which time the suspended matters vary very rapidly and continue normally in excess of the annual average, reaching at times more than 5000 parts per million. Another feature of great importance in explaining the difficulty in purifying these very turbid waters is the fact that a considerable proportion, say about one-fourth, of the suspended matters consist of minute clay particles. The sub-microscopic nature of these particles has already been referred to by the speaker, and it may be further added that it is practically impossible to remove them by subsidence.

The third, or intermediate, class of water, such as found in the Delaware, Susquehanna and Allegheny, etc., contains suspended matters ranging apparently from about 25 to 75 parts per million, on an average. In duration of flood periods, proportion of clay particles and in the size of clay particles, this class of water stands intermediate between the two previously

described. The evidence, however, shows that in some instances there are decided complications from coal dust and mine drainage.

With regard to the amount of dissolved color or vegetable stain contained in these general types of water, it may be said that many, but by no means all, waters of the first class contain more color than is considered by some to be satisfactory. To this class of waters of the glacial drift area there must be added swamp waters from all sections of the country. No attempt will be made to show in detail the general evidence as to the color of this type of water, partly because of lack of available comparable records, and partly because of the unsettled condition of the problem of what amount of color is permissible in a first-class public water supply.

The dissolved color in the waters of the second and third types is not a factor of practical significance, so far as the speaker has been able to learn. Undoubtedly, organic matter capable of producing a vegetable stain reaches these turbid waters, but it seems to be removed in the streams and settling basins. Apparently, it becomes united to the silt and clay particles (hydrosilicate of aluminum) and settles to the bottom with them. In a measure, this may be called filtration of silt and clay through water.

From this account of the conditions met with in America, it will be seen that the method of purification to be adopted in any instance must be adjusted to the requirements of the water under consideration. Further, the character of many surface waters in America is such that, in the design of purification works which shall successfully meet the requirements of the future, careful attention must be given, not only to the question of bacterial removal, but also to the decolorization and clarification of the water.

Of the methods of purification now considered in America, there are two important ones, as has been very clearly shown by Mr. Hering, who has described and compared their leading characteristics. The nomenclature used in this line of work in America is in quite a transitional and unsettled state. The term "filtration of water" was satisfactory so long as it was applied to waters which were not excessively colored or turbid.

Since the subject has grown and included the consideration of the more complicated types of water, the term "purification of water" is considered by many to be more logical and comprehensive. For many waters, filtration by itself is inadequate, and there are required in connection therewith plain subsidence, coagulation, and supplementary subsidence. In some places the expression "method of filtration" has been replaced by "method" or "systems of purification." With regard to the two methods of filtration proper, they are variously spoken of as sand, or English, or slow filters, and as mechanical or American, or rapid filters, respectively. Upon comparing the two methods of filtration when each is operating at a high degree of efficiency, it is found that there is a long series of differential features, of which the most important is the physical condition of the water as it enters the sand layer. To many it seems desirable to avoid a nomenclature which gives undue prominence to one superficial feature, and to use a name which implies a series of conditions requisite for first-class work. By these engineers the two methods are called English and American filters, respectively, from the countries where they are first developed.

Water purification on a practical scale in America is in its infancy. Ten years ago its application was almost nominal. During the past decade, however, considerable progress has been made in the small cities and towns. At present it may be said, in general terms, that there are about 20 English sand filters in service in America, having an area of about 17 acres, and yielding about 25,000,000 galls. of water as a daily average. There are also in service about 160 American, or mechanical filter plants, having a nominal capacity of about 250,000,000 galls. daily, but actually supplying a consumption of only about half this quantity.

With few exceptions, these purification plants by both methods are very small, and there is comparatively little information available, showing continuously in detail the efficiency and the cost of operation. Under these circumstances, American engineers are obliged to base their detailed knowledge of water purification, in a large measure, upon the results of European experience and of the careful investigations made on an exper-

imental scale at Lawrence, Providence, Louisville, Pittsburg and Cincinnati. The European experience, in connection with the purification of waters comparable to those now filtered abroad, has been carefully followed in America for many years, beginning with the classical report made by the late James P. Kirkwood, M. Am. Soc. C. E., for the city of St. Louis. For the purification of the more difficult types of water, due to their excessive color or turbidity, dependence is now placed on the laws of purification as deduced by the special studies in the cities just named. Upon the more important points it is considered that this evidence is substantially correct for the types of water actually studied, and it is now being used as a guide in the design and construction of purification works for a number of the larger American cities.

Concerning the relative merits of the two leading methods of purification, the experience of the speaker has led him to the opinion that English sand filters, as a rule, are most satisfactory in point of efficiency and economy for those waters for which they are strictly applicable. Such waters may be defined as the non-clay-bearing waters, which are only slightly or moderately discolored by vegetable stain, and which are found in the first type of waters mentioned in this discussion. Although it is well known that these filters have decided limitations in the successful treatment of very colored and very turbid waters, it is a difficult matter at present to define satisfactorily the dividing line between those waters for which this method of purification is applicable or non-applicable. There are some cases in which this method is strictly applicable for the local water where it is probable that its adoption would be inadvisable on the ground of cost, owing to the area which it requires, thus necessitating an isolated location and an extra pumping of the water. Notwithstanding the fact that English sand filters are applicable for a far smaller proportion of the American water supplies than was generally considered to be the case a few years ago, it is the opinion of the speaker that they have a large field of usefulness in America, and that they will be adopted in many places within the next few years.

Referring to the construction and operation of English sand filters in America, it may be fairly said that the recently com-

pleted purification works at Albany, N. Y., designed by Allen Hazen, M. Am. Soc. C. E., and described in a recent paper* before the Society, may be taken as representative of the best current knowledge in this line, based both on European experience and American investigations. These filters differ much from the older filters of Europe, but do not differ very materially upon the more vital points, when compared with the best modern filters abroad. Nevertheless, they have an individuality of their own. Among the more interesting and important features of the Albany filters, from the standpoint of efficiency and economy, are the arrangement of the floor with the thin layers of gravel to support the sand, and the means taken to prevent the passage of water between the walls and the sand.

The recent estimates made for English sand filters at a number of American cities are on the basis of an average capacity of 3,000,000 galls. (U. S.) per acre daily. In view of the fact that the maximum consumption in some places ranges from 25 to 50 per cent. above the average, during very hot and very cold weather, the rate would at times reach between 4,000,000 and 5,000,000 galls. per acre daily, even with moderately large distributing and compensating reservoirs. From present evidence this seems reasonably safe for very short periods, unless the raw water should be excessively polluted. In fact, it appeared from experimental evidence obtained several years ago at Lawrence and elsewhere, that, with some kinds of water, rates of 5,000,000 and even 7,500,000 galls. per acre could be safely used. More recently, however, the very careful studies made at Lawrence, with reference to the passage of *Bacillus Coli Communis*, the leading intestinal bacterium, indicate that these rates are too high for such waters as that of the Merrimac River. In the event that rates of filtration have to be increased materially, to meet unusual conditions of consumption, experience indicates that the changes should be made gradually and not suddenly. In fact, proper regulation of the rate of filtration is now universally recognized as an essential feature of successful filtration; and the introduction of devices to secure this end show one of the most marked improvements in the new over the older filters.

There is some difference of opinion in America concerning

* *Transactions* Am. Soc. C. E., Vol. XLIII, p. 244.

the conditions under which covers should be provided for English sand filters. A few years ago it was thought that this could be settled by use of the mean January temperature, on the basis that covers would be required where this temperature was at or below the freezing point. More detailed studies of temperature conditions, however, show that every few years there are exceptionally cold winters during which there are so many days in succession when it would not be practicable to scrape open filters, that the foregoing rule seems to be questionable. According to the opinion of many engineers, experience will ultimately show that covers are an advantage at nearly all points on and north of the Potomac and Ohio rivers. If this should prove true, it would necessitate covers in nearly all the American territory where English sand filters now appear to be applicable. With regard to the effect which covers produce upon the bacterial efficiency of the filter, in connection with vegetable growths, etc., this is a point upon which there is very little or no evidence in America.

With regard to the American or mechanical filters, it is well known that they are proprietory devices of comparatively recent origin. The more important patents, however, will expire shortly. Prior to 1885 these filters were used exclusively in the treatment of water for industrial purposes for the removal of vegetable stain and turbidity. Since that date they have been introduced for the purification of many public water supplies, and during the last few years progress has been very rapid. For the most part they have been installed for small works, not so much because they were necessarily the most applicable process for each water, but rather, perhaps, on account of the filter companies guaranteeing certain results with devices of fairly low first cost.

Up to 1895 very little was known of the hygienic efficiency or cost of operation of these filters. Naturally, they were not looked upon with favor by the great majority of engineers. During the last five years there has been a great increase in our knowledge of the leading features connected with these filters. This is particularly so in the detailed knowledge of coagulating processes, which are such a vital matter in this type of filter. Without coagulation one can expect from them no hygienic

efficiency. As already stated, the proper degree of coagulation of the water as it enters the sand layer is the key-note to their successful work. When this is satisfactory, such factors as rate of filtration, size of sand grain, thickness of sand layer and detailed method of cleaning the sand layer, appear within reasonable limits, to drop into comparative insignificance. At one time it was quite universally feared that the use of such coagulants as sulphate of alumina might result prejudicially to the health of those using water purified in this manner. As a result of most careful studies upon this point, it may now be stated that when the coagulant is applied in proper quantities in the presence of proper quantities of alkaline constituents of the water, there need be no fear of undecomposed chemical in the effluent. With this process it is imperative that the supervision should be such that at no time should the inadmissible result be met of applying more coagulant than can be completely decomposed. In this decomposition there is a conversion of the carbonates of lime and magnesia iuto the sulphates of these bases, with the liberation of a corresponding quantity of carbonic acid. The alumina itself is, of course, removed as a flocculent precipitate.

If the merits of filters of this type were to be judged from the general knowledge as to their efficiency, as now obtained in practice in the majority of cases, the indications are that it would not receive a rating of the highest grade. This seems to be due, in part, to a lack of the necessary skilled supervision at small plants, and, in part, to a desire to avoid the expense of applying a sufficient quantity of coagulant. From the results of extended investigations upon the subject, however, it is considered that sufficient knowledge is available to design and operate by this method plants which will give first-class results, when judged practically from the highest plane of excellence. From the added knowledge of tests of short duration upon recently constructed plants in practice, it is felt by the speaker that the laws of this process, so far as they have been formulated, are substantially sound and accurate.

Concerning the applicability of this method of purification, it is the judgment of the speaker that, for the non-clay-bearing waters, which are low in amount of dissolved color, it is, as a

rule, less suitable than English sand filters. This is based on the present general evidence that for this type of water the English filters can give a thoroughly satisfactory effluent, and at a total cost equal to or slightly less than that of American filters; that the use of coagulants is to be avoided where not imperative; and that the use of coagulants for these waters is especially undesirable and exacting in the control of their application, due to their low alkalinity. There are, of course, exceptions to this general rule, such, for instance, as cases where the compact form the American filters would permit of a location where extra pumping would be avoided, and where this could not be done with English filters.

The especial field of usefulness for the American filter is in connection with the purification of those waters which are either so highly colored, or so highly charged with sub-microscopic clay particles, that it is impossible to obtain satisfactory results without the use of coagulants. With waters which require a coagulant, either constantly or for the great majority of the time, the present evidence shows that, as a rule, the American system of purification is the better. For very turbid waters this system consists of plain subsidence, coagulation and supplementary subsidence, and mechanical filters. For such waters the use of English sand filters would increase the total cost somewhat; they would give normally no higher grade of purification; they would be more difficult to operate; and, for the latter reason, there would be a tendency for them to yield a less satisfactory effluent at times when the river water would be most variable in character.

In explanation of the point that, with English filters, purification plants for very turbid waters would be more difficult to operate, it may be said that the great rapidity with which the character of the water changes makes it very difficult, and in a measure impossible, to apply at all times, just the proper quantity of coagulant at the inlet to the coagulating basin. Obviously, this would be kept as low as consistent with good efficiency, for the sake of economy. If it should be found that the application of coagulant was too small, it is possible with American filters to correct this by adding more coagulant as the water reaches the filters, thus maintaining the efficiency of

the plant. With English filters this is not possible, because, if the coagulant were applied at the outlet of the coagulating basin, it would clog the surface of the sand very quickly, and put the entire plant out of service for some little time. From a practical standpoint, the speaker attaches great importance to this feature, which was repeatedly noted during the investigations at Cincinnati.

There has as yet been very little experience in the purification of waters containing large amounts of dissolved color. Judging from experience with the recently completed works at Norfolk, Va., it appears that the American method with mechanical filters is the better, for reasons similar to those stated for the clay-bearing waters.

Concerning the purification of those intermediate types of water, which for short periods are moderately colored or turbid, there are not sufficient data to draw any well-defined lines. A careful study of local conditions, with reference to the characteristics of the two methods of purification, can alone settle the matter properly for the present.

SAMUEL RIDEAL, D. SC.*—The remarks on the American practice with mechanical filters has greatly interested the speaker. Speaking as an English chemist and bacteriologist, he thought that the lesson to be learned from this discussion was that English engineers should give these mechanical filters a trial in this country, parallel to the trials that American engineers were giving to the English method of sand filtration. Mr. Fuller's remarks seem to show that there is a future for mechanical filters in England, where recent practice has been to do away with the sand-filtered water supplies from rivers, and to go to the mountain and upland surface waters, many of which, containing vegetable coloring matter, would seem to be very amenable to this mechanical filtration. These waters frequently give rise to plumbism. With a mechanical filter using alum (and lime, if the water is not sufficiently hard from carbonate of lime), the coagulant would correct that evil; so that with mechanical filtration, using alum with or without lime, we should effect removal of the vegetable coloring matter and prevent plumbism at the same time. That our method of sand

* London.

filtration seems generally to give a better bacterial purity than the mechanical filters, may be due to the fact that the latter have been worked at a much greater rate, and perhaps with the minimum quantity of coagulant, without due regard to the reduction of bacteria; a difference that doubtless could be removed.

Neither method of filtration can, however, be regarded as a satisfactory means for preventing the appearance of pathogenic germs in water. No matter how small the fraction of the organisms left, there might be among them some which might be injurious to health. Therefore, although either sand filtration or mechanical filtration is a very good line of defense, it is not the only line of defense one should rely upon.

The speaker believes that the question of sterilizing water will soon become prominent and that the removal of pathogenic organisms can only be effected satisfactorily and economically by heat sterilizing. He used the term "heat sterilizing" (a somewhat misleading phrase) purposely, because he wished to accentuate before a body of engineers that it is not a question of heat sterilization at all, but a temperature condition. The organisms are killed when they reach a certain temperature, and a maintenance of this condition does not necessarily involve the expenditure of any energy.

The problem of bringing a body of water to a high temperature, and keeping it at that temperature sufficiently long to insure the death of the organisms present, is one which he believes would be worth while for engineers in this country and in the States to pay special attention to. The cost of bringing very small quantities of water—perhaps two or three pints per head of the population, instead of the 65 or 75 gallons—to a temperature which will insure the killing off of the pathogenic organisms, cannot be very large. By a proper system of incoming and outcoming of the water, and possibly by a vacuum jacket such as is used for maintaining a very low temperature, the expenditure of the heat or energy, either gas or electric heating, which would be required for bringing about such local sterilization of water for potable purposes, would be very small indeed. Probably in the States as well as in this country legislation could be brought to bear in the same way that we now have by-laws for

limiting the quantity of waste in flushing closets. In this way it would be possible for the municipalities to supply to every consumer a machine for producing sufficient sterilized water for potable purposes, while leaving the supplies and mains in their present condition.

HENRY DAVEY,* M. Inst. C. E.:—The speaker thinks that a high tribute is due to Mr. Hering for his discussion, in which the case is stated very clearly, and in which opinions are expressed which seem perfectly in accordance with the facts of practice. On this question, and referring only to the English practice, or what has been termed the sand filter, the speaker, who for many years has had charge of very large filter beds dealing with large quantities of very impure river water which it is necessary to filter and bring into a proper state for domestic use, has very little to say, because the general principles have been so thoroughly stated that he could only repeat what has been already said, or go into minute questions of detail which would not be profitable.

He would, however, like to emphasize what has already been said. The question of sedimentation is a highly important one. If storage reservoirs can be made sufficiently capacious, the quality of the water may be so improved that the work on the filters is reduced. In the sand filter, as has been pointed out already, it is only the thin layer of the surface that does the work, and the object is to maintain that thin stratum in a quiescent state in order that the bacteriological effects may properly take place. The rate of filtration, then, is an important point, because time must be given for these bacteriological operations. Four inches per hour has been named, and that, according to the speaker's experience, is good practice in England; but, as Mr. Deacon has intimated, the longer the filter works, the less will be the rate. If an average of 4 inches is taken, it may be too rapid to begin with. We know that when the water is put on the filter immediately after the filter has been cleansed, that there is very little effect—the water goes through. The filter should be worked for the first two or three days at an exceedingly low rate in order to produce the film that is necessary without letting many

* Engineer, Birmingham, England, Water-Works.

bacteria go through. When the filters are newly made they should be worked very slowly indeed to get the best results. Much depends on the class of water, but, from the speaker's experience, 4 inches per hour should be the maximum with waters that are high in bacteria.

Although a thin layer of sand is all that is necessary to maintain the surface film, yet a considerable thickness is desirable, for the reasons which have been mentioned by Mr. Deacon. The speaker has found that in a section of the filter bed having a depth of sand of say 4 feet, there are streaks of pollution through the sand, showing that if that had been very much thinner much polluted matter would have gone through. He thinks it is a safe thing to have a great depth of sand, but, as has been already pointed out, it should be sand and not pebbles and gravel, which are only useful as a support. An important point which has given the speaker considerable trouble is that, unless the inlet to the filter is properly constructed, the current of water around it disturbs the sand, and the water at once finds its way down through without the surface film being formed. It is not necessary to go into the actual construction, but merely to mention that the distribution of the water over the filter and on the filter, in such a way that the surface is not disturbed, is an important point to be taken into consideration.

J. N. GREENE, M. Am. Soc. C. E:—The speaker would like to ask some of the learned gentlemen who have discussed these questions, and who have had experience in filtration, to explain how to eliminate from the filtered water, after it has gone through the filter, all the filty things, such as the drainings from cesspools, stables, dye houses, tanneries and everything that borders the streams which flow into the river; how can all those impurities, which are held in solution, be eliminated, and a good water be secured by filtering?

The real secret of this evil of consumption of foul water lies often, and, indeed, in most cases, in the short-sighted, makeshift way in which communities treat this, one of the most important subjects connected with their life and health. In numerous instances, all over this and other countries, large cities and small communities, upon this "good-enough-for-the-present" plan of doing things, have expended large sums upon

impure water improvement, knowing it to be so at the start, and growing worse every year; and, even with such experiences, go on and enlarge the same, at great outlays of money, which they do only to increase an existing evil, instead of putting the knife to the root and expending their money for new plant to secure pure, or approximately pure, water. Philadelphia, Pa., and Bangor, Me., are striking examples of this class. In short, the speaker does not believe it is practicable or possible to obtain pure water by filtering water which is loaded with impurities held in solution when the filtering process is begun.

The surest way to get pure water is to go further and spend more money and get water that is pure and fit to use, without the artificial and never-satisfactory process of filtering.

DR. AD. KEMNA (Antwerp, Belgium):—It is apparently easy to point out many shortcomings in the introductory discussion, and practically this is what has been attempted by the various speakers. But on closer examination it appears that all that has been said may be found in a very concise form in Mr. Hering's discussion, the interesting discussions being but instances of the general principles laid down as a basis.

There is, however, one important point which it is necessary to emphasize. The action of sand filtration is essentially a biological one. The mechanical action of straining is obvious; but, as microbes are much smaller than the interstices between the grains, this action alone does not account for their retention, and it is absolutely inadequate for the reduction of the dissolved organic matter. Various theories have been proposed; the one which considers reduction as a fermentation is consistent with the greatest number and the greatest variety of facts.

So, for example, an apparent contradiction can be easily explained. Animal pollution is easily reduced by filtration, while we have it on the authority of Mr. Fuller that vegetable color is extremely hard to remove. Now we know from our school chemistry that vegetable organic compounds are much more stable than animal nitrogenous contamination; the filter masters the one and fails with the other. Besides, microbes do not act on all substances; in racemic acid the tartrate will be destroyed and the right remains unaltered; similar cases are likely to occur with the mixture we call organic matter in water.

Negative proofs can be given of that biological action. In moderate climates, the bacterial efficiency of sand filtration is over 99 per cent.; but in colder climates, like Warsaw and Odessa, only 96 per cent. is reached, and, according to Simin (Moscow) the reduction is as low as 60 per cent.

There was a spell of sharp frost over Western Europe in December, 1899. The cold had not set in three days before the filters of Antwerp gave insufficient bacterial and chemical purification. The size of a pin's head of the slimy upper layer gives in the field of the microscope generally over 200 living organisms, chiefly diatoms; during the cold there were 4 or 5, and it seems reasonable to admit that their vital activity also is greatly diminished. A chemical process (iron and marble) was applied with good results to insure the quality of the supply.

Another proof is the interesting fact that at Louisville, according to Mr. Fuller, ordinary sand filtration does not work; the high turbidity of the Ohio water shuts out the light, which is essential to the development of diatoms.

The sand filter has been, and is still, in many places, a very simple thing; it is a heap of sand; water is poured on the top and extracted from underneath; it is worked by a foreman, who knows, of course, how much water he pumps on the filters, but he cannot always tell how much each particular filter is doing, its speed, etc.; generally the filters are left to settle that between themselves. This is the acme of simplicity.

But now compare with what has been said up to the present time. At the intake end, Mr. Lindley wants a very elaborate arrangement for subsidence, to be worked differently according to meteorological data. In summer the water is made to travel downward; in winter it is to take the reverse course. The admission to the filters is regulated by automatic processes so as to keep a constant level above the sand. The filter itself as described in 1899* presented many special features, namely, a series of layers of gravel systematically arranged. The water is not allowed to leave the filter without having to pass a special chamber, with automatic machinery to regulate its flow. But its troubles are not over yet, for now comes in Dr. Rideal, who says: "Filtration does very well; it takes out 99.9 and a series

* Congrès pour l'Utilisation des Eaux Fluviales, à Paris.

of 9's of microbes, and I want to kill by heat the last one." All these various processes added together make up a long list of complicated appliances.

It has been said that facts are the only things considered by engineers. But facts are nothing by themselves and they get a bearing only in conjunction with a theory to explain them; if it is contended that there is no theory, that means only that there is no avowed theory and that we are led by an unconscious one. Can there be any doubt that an outspoken theory, which can be discussed, is to be preferred? The very common belief that theory is of no practical avail and is at the best an intellectual luxury is utterly wrong; it is an inquiry as to causes of phenomena and the reasons for things and is therefore an absolute necessity. No better example can be adduced than sand filtration itself, which made no progress during fifty years, and was rapidly modified and perfected as soon as the biological theory gave the right explanation. It will pay to examine by the light of our theoretical knowledge, as far as possible, the various complications which have been proposed in the ordinary sand filter. But at the same time we must keep in mind that there are practical limits.

Taking up again the course of the water, we meet at first sedimentation, relied upon in England for improving the quality. Direct oxygenation is the explanation which probably is in the minds of most engineers; but experimental proof of this action could not be given. Mr. Fuller has suggested another cause—the subtraction of dissolved organic matter by the suspended clay. Then there is vegetable life favored by light, which also does a good deal. But it is still an open question whether the amount of preliminary purification is worth the money invested in large reservoirs.

When the water is kept in constant motion, Mr. Lindley's scheme seems the best to insure the utilization of the full volume of the reservoir for decantation. The walls and partitions necessary to make the different channels are a small extra cost when the reservoir is covered, as it must be under a climate like that of Warsaw. But when ordinary open reservoirs are used, the surplus expenditure becomes comparatively large. It can be avoided altogether, however, by subdividing the reser-

voir into separate sections, successively drawn upon, and in which there will be no flow at all; many observations seem to show that there is a better settling with a few hours' complete rest, than with a long run even at a very slow speed. This very simple theoretical consideration enables us to consider the complications of the intake, not as an absolute advantage in all cases.

A great deal of simplification has been done by Mr. Lindley himself as to the gravel. The only part the gravel has to play is to give a support to the sand and an exit for the water; and as soon as this is done efficiently, nothing more is wanted.

The thickness of the sand is a much discussed question; the small size of the grain is all-important for the mechanical action of straining; the thickness of the bed is all-important with the physical theory of surface action, very popular some decades ago, when chemistry told that dissolved matter was abstracted from the water. But it is an undisputed fact that quartz has only a very limited power of adhesion, quite unlike that which is so marked with aluminum compounds. In the light of the biological theory, the sand is something like the gravel—a support to the superficial living layer. The well-ascertained fact that thick filters give an effluent of more constant bacteriological composition has received a simple mechanical explanation from Allen Hazen, M. Am. Soc. C. E.; if the superficial layer is broken in some places, a thick bed of sand allows of only a small direct flow, and contamination is kept down to a minimum.

As the reduction of dissolved organic matter is a fermentation, some time must be allowed for it; the retention of the microbes is a sort of compromise between the erosive mechanical action of running water and the stickiness of the stuff coating the sand grains; for these two reasons the rate of filtration must be kept within certain limits. The 4 inches per hour, or about 2.5 m. per day, is the limit fixed by the German Imperial Health Office; it is a limit, and, as the engineer of Birmingham has very well pointed out, that speed cannot always be given. The pace of a man walking is, say, 1 m., but that cannot be expected from a child. When a filter has just been scraped it is in its infancy and must be worked very gently at first. As soon as the filtering layer has formed, the speed may be increased, and,

according to experience at Antwerp, may be much more than the 4 inches per hour and still give good results.

The suggestion of Dr. Rideal to sterilize the water is based on the fact that some epidemic diseases are caused by water-borne microbes. It is obvious that absolute security can only be obtained by complete sterilization, but the practice of fifty years' filtration proves that the risk of contamination is an exceedingly small one. A heating apparatus for thousands of cubic meters means a large expense; a special canalization for a few liters of water a day is another big item. It is a question whether that very small increase of security is worth the extra expense, the more so as the temperature of 70° Cent., mentioned by Dr. Rideal, will certainly not kill all the spores, some of which are very resistant.

The discussion has wavered between English and American filters. In both cases sand is applied, but that is the only point they have in common. In both cases this point is unimportant, the sand being only a support—in the ordinary filter a support to a layer of algæ and clay in which biological actions are prominent—in the mechanical filter, merely for straining out the coagulum. Ordinary sand filtration is not at all an artificial process. We cannot order life to multiply, and the microbes and algæ to work in a special way; we are completely at their mercy. In the mechanical filter a chemical compound of known composition and predetermined reactions is used which can be adequately dosed. The comparison between the two processes is really an antithetic one.

It is useless to emphasize the necessity of purifying all superficial waters when used for distribution. It is only a question of cost, depending, of course, on the amount of water to be treated; so that the possibility of bettering a supply is intimately connected with the stoppage of leaks and wasteful use. This appears to be very large in England and absolutely enormous in America. It causes large expenditure to provide water, the tenth part of which only is really used. It also increases the amount of sewage, making here again purification more costly, and contaminating the water-course, sometimes the very river from which the supply is derived. Generally, people are shrewd enough not to pump the same water over and over

again, but send it down the river to the town below. In the first case, the course of the water is a circulus of life; in the second case, it is a spiral.

Referring to the remarks of Mr. Walter Hunter, the speaker feels bound to say that the abandonment of bacteriological analyses for the water-supply of six millions of people is a step in the wrong direction.

Answering Mr. Greene, it must be admitted that pollution cannot be kept out, and must therefore be dealt with. This the filter does, and the fact should be emphasized, that sand filtration is not an artificial or a theoretical process, that it is a natural process, especially because that process is exactly like what goes on in the purification of springs, which invalidates the sentimental argument against purified river water. A clear, beautiful, wholesome spring is something which comes out of the ground; but before coming out it was in; and before being in it had to come in from above as rain water through the air. The first stage of entrance, viz., the percolation through the upper layers of soil is a stage of enormous pollution, much greater than that of any stream. But lower down all is taken out by the natural agencies of the soil and by a series of very complicated chemical, physical and bacterial processes, exactly the same as in the surface layer of a sand filter. Engineers and scientists who have charge of a sand filter cannot claim that they do the work; it is the filter which does it for them, and does it very well.

WALTER HUNTER,* M. Inst. C. E.:—The speaker agrees with Mr. Davey and other speakers as to the desirability of sedimentation before filtration, as no doubt it eases the working of the filters, but wishes at present to deal especially with Dr. Rideal's remark, to the effect that it is necessary to take the last odd microbe out of the water. He recollects very well being told by Mr. Hawksley, whose name is so well known in the water world, that when he was at the meeting of the British Association at Bristol two years ago, there was a learned scientist there of the same profession as the learned doctor himself, who stated that he had put his children on sterilized food and water and they immediately began to droop. He found it was absolutely

* Engineering Director, Grand Junction Water-Works Company of London.

necessary to return to ordinary food and ordinary water in order that they might thrive. That is a practical illustration. The speaker thinks we owe an immense deal to the chemist and bacteriologist, who set us up an ideal to which we could strive to attain; but still he believes they sometimes go beyond what it is possible to attain in practice, and also beyond that which is really desirable. He has noticed that sometimes a sample of water has been termed inferior in quality, because it happened to have just double the quantity of certain chemical matters contained in another sample. Take organic carbon, for instance. One sample had 0.162 in 100,000 parts, and another sample 0.309, the difference being 0.147 in 100,000 parts, or $\frac{1}{680}$ $\frac{1}{272}$. Again, organic nitrogen in one sample was 0.028 in 100,000 parts, and in another 0.033, a difference of 0.005 in 100,000 parts, or $\frac{1}{20}$ $\frac{1}{000}$ $\frac{1}{000}$. These are figures one cannot easily grasp, and are really infinitesimal, both samples being equally good for all practical purposes.

After all, the great testimony as to the quality of any water is found in the statistics in regard to the health of the community supplied. The admirable way in which the water supply of London is conducted, for instance, can be so shown. When the death rate in the Metropolis is, as it was a week or two ago, something between 12 and 13 per thousand, and when the average for the year continues from year to year to be something between 17 and 19, and, when, too, the very small amount of enteric fever which we have in this enormous city is noticed, the inference that the filtration of the water is carried out in a very admirable way, and that the community has no need to fear in regard to the quality of that water, seems fully justified. The Thames has been wonderfully improved by the action of the Thames Conservancy during the past few years. The raw water taken from the river is at least 33 per cent. better than it was. We are able to deal with it absolutely well by filtration, taking out something like from 98 to 99 per cent., or 99.999 per cent. of the microbes, and the chemical analyses, as made by Sir William Crookes and Professor Dewar, and also by the government analyst, Doctor Thorpe, are most satisfactory. The speaker desires to add that Doctor Thorpe, the new chemical examiner for London, has dropped the system of microbial

examination which was adopted by the late Sir Edward Franklin, and confines his attention to chemical analysis.

H. ALFRED ROECHLING, M. Inst. C. E. (by letter):—The writer is very sorry not to have had the pleasure of joining in the oral discussion, but urgent unforeseen business had prevented him from doing so. He is glad, however, to make a few written observations, as he is of opinion that the exchange of views between brother engineers in different countries is very desirable and tends in the end to break down that barrier of apparent indifference which at times seems to exist.

He will confine his remarks to a point in sand filtration which is frequently overlooked.

When Simpson first introduced sand filtration at the Chelsea Works on a large scale, about the year 1839, he had no idea in what manner the purification of water was brought about in this process; he imitated Nature, and, as Nature's own processes are generally simplicity and perfection, he succeeded. Since then this process has become popular in all countries, and its application has extended from year to year, but its merits were only instinctively guessed and were not exposed and explained scientifically until within the last 10 or 15 years, when, chiefly through the means supplied by Koch, it had become possible to ascertain the organized matter in water, *i. e.*, the germs, microbes, micro-organisms, or whatever name we may give these minute beings, which belong to the vegetable kingdom.

The results then obtained clearly proved that the process of purification in sand filtration was chiefly brought about by physical or mechanical agencies, *i. e.*, the suspended matters, both organized and unorganized (living and dead) were removed, but the chemical composition of the water was but little affected.

How did this take place?

The slimy skin, which formed sooner or later on the surface of every sand filter, when surface-derived waters were being filtered, acted as a very fine strainer in catching and retaining the suspended matters in the water. By degrees this skin became so exceedingly retentive that it would not even allow the liquid to pass through, and then the filter had to be cleaned.

But if there was an almost impermeable layer gradually forming on the sand surface, how was the air to pass through,

without which the micro-organic life could not carry on its work in the pores of the sand, gradually splitting up organic matters and changing them into mineral substances? And even if the process of mineralizing organic matters were not entirely due to biological agencies, it was pretty well established that in the absence of oxygen these changes soon came to a standstill.

When it is remembered that sand filters are now being filled from below, and that every care is taken to drive out the air contained in the mass of the sand; when it is further kept in mind that afterward an impermeable skin is gradually formed on the surface, it is not surprising to find the results previously stated, viz., the removal from the water of all suspended matters, but no great improvement in the chemical composition of the water.

The writer had been asked how he explained a slight chemical improvement which was noticeable with most waters, and he had stated that these small chemical changes went on until the oxygen contained in the sand and water was used up.

Totally different to the sand filtration of drinking water was the filtration of sewage or any other impure liquid through land, which process the writer had named the natural self-purification of sewage. Here it was of the utmost importance to prevent a crust forming on the surface of the land, so as to admit plenty of air to the micro-organic life in the soil, which carried on the benevolent work of mineralizing organic waste matters.

The writer has not time to go into the very interesting difference between water and sewage filters, and will only point out that the conditions of work in them are reversed, hence the results are reversed also. In the filtrate from sand filters there are but few germs and no chemical improvement; in the effluent from sewage filters there are millions of germs and a decided chemical improvement.

In conclusion, the writer is of opinion that the raw material for a public supply for drinking purposes should be chemically and otherwise as free from objection as possible, so as to reduce the difficulties and the costs of purification, because it is a lengthy and expensive process to use first a filter constructed on the same principles as a sewage filter and afterward a water filter, as we now understand them.

Military Notes.

"THE PHILIPPINES."

WE recommend the perusal, by every officer of the Army, of Captain Parker's article, entitled "Random Notes on the Philippines," published in the present number of the JOURNAL. His comments on "tactical formations," on "controlled fire," and the "necessary exposure of officers" are all worthy of deep consideration, coming as they do from one who has had actual experience of the subjects of which he treats. His arguments are sound, and his logical conclusions certainly demand an alteration of our present drill and small-arms firing regulations.

GENERAL A. R. DORWARD.

Major Lee, reporting to the United States Government, has borne handsome testimony to the value of the work done at Tien-tsin of Brigadier-General A. R. Dorward, C.B., R.E., whom he speaks of in the most eulogistic terms.—*Army and Navy Gazette.*

RELATIVE VALUE OF ARMS.

The contingent sent by the several powers to the Allied army in China being all armed with different rifles, an opportunity will be afforded of noting the value of the various weapons, more especially with regard to the degree in which they will bear the wear and tear of a campaign, and their effectiveness in actual work in the field. The *Schweizerische Militärzeitung* has compiled a list of the rifles which will be carried, from which it appears that no two contingents will be armed with the same pattern of fire-arm. Among other points in which the weapons differ from one another is their weight. The Austrians, it appears, carry the heaviest rifle, its weight being 4220 grammes (or very nearly 9 lbs. 4½ oz.). The Swiss and Portuguese rifles are nearly as heavy, weighing 4190 and 4130 grammes respectively. The rifles of the British, French, Danish, and Russian troops are all of the same weight, namely,

4070 grammes (8 lbs. 5 oz.). The Spanish rifle is much lighter, weighing only 3870 grammes; and then come the Belgian and Turkish weapons, 120 grammes less. The lightest of all, however, are the German and Italian rifles, weighing only 3540 and 3450 grammes respectively (7 lbs. 12½ oz. and 7 lbs. 9½ oz.). The Italian soldier has, therefore, so far as the weight of his rifle is concerned, to carry ¾ of a kilogramme, or nearly 1 lb. 11 oz., less weight than his comrade in the Austrian army.—*United Service Gazette.*

THE PAY OF RESERVE OFFICERS.

The Queen has approved a Royal Warrant to amend the regulations for the issue of outfit, allowance, and gratuities to retired officers and other persons specially employed as officers at times of national emergency. The following substitutions are to be made in the warrant for the pay and non-effective pay of the army, with effect from October 1, 1899:

"601 A.—An officer who retires with retired pay or gratuity, if specially taken into employment during a national emergency, or serving with the embodied Militia, shall be granted any increase of retired pay or gratuity for which his further service (excluding any period for which he draws retired pay) may qualify him. This shall not apply to officers who draw pay under Art. 488 B.

"601 B.—An officer, whether of the Reserve or not, specially taken into employment during a national emergency shall, upon ceasing to draw full pay, be entitled to a gratuity of £100, and after the first twelve months of service, a further gratuity of £50 for each year of service at home, and £100 for each year of service abroad, portions of a year being calculated at the same rate, and subject to the following conditions: 1. That the officer serves for the full period of his engagement, or of the emergency in respect of which he is employed, unless a shorter period is specially approved by the Secretary of State. 2. The gratuity shall not be given to an officer who obtains an increase of pension or gratuity under Art. 601 A or to an officer paid under Art. 488 B. 3. The following officers are eligible, provided that they fulfill the above conditions—Reëmployed retired officers, officers of embodied militia except those of the per-

manent staff, officers of auxiliary forces employed upon army service, ex-officers or civilians appointed to military positions in Imperial forces or in Colonial forces, paid at the Imperial Army rates."

The following will be substituted for par. 675:

"An officer who has retired from the army or from the auxiliary forces, and is taken into employment with the Regular forces during a time of national emergency will be granted, in aid of his outfit, a sum not exceeding £100. This rule does not apply to officers who are at the time of reëmployment upon the effective establishment of the army."

"In respect of 'ex-officers or civilians appointed to military positions in Imperial forces' mentioned in par. 3 of 601 B above, an instruction from the Secretary for War states: 'Officers employed in the Royal Reserve regiments or in the Imperial Yeomanry or proceeding with Volunteers upon active service are included amongst those entitled to the gratuity under the above conditions. A gratuity due under the above regulations will be issued by the paymaster or agent who makes the final payment of full pay to the officer concerned, without special authority.'"—*United Service Gazette.*

LODGING ALLOWANCE OF BRITISH OFFICERS.

The British Secretary of State for War has authorized for officers who, in present circumstances, are going to China, the continuance of lodging allowance, etc., under the same conditions as in the case of those officers who have gone to South Africa.

BELGIAN TROOPS IN CHINA.

From the *Revue du Cercle Militaire* we learn some particulars respecting the contingent which Belgium is sending to join the Allied forces in China, and which will leave Brussels about the end of September. The force will consist of one battalion of infantry (of four companies, each company comprising three sections of infantry and a section of artillerymen with two Hotchkiss machine guns), a small mountain detachment and two mountain Cockerill guns. The total strength will amount to 45 officers, 675 rank and file, 157 horses, 10 guns, including machine guns, and 24 vehicles. The pay of the officers will be considerably higher than that which usually obtains. The

commandant will draw £1000 a year pay, £60 a year allowances, and £72 as outfit-money. The captains and subalterns will each receive respectively £480 and £280 a year pay, £44 and £40 a year allowances, and £27 and £23 outfit-money.

FRENCH AUTUMN MANŒUVRES.

The autumn manœuvres of the French army are this year to be on a very extended scale. The force, which will comprise over 100,000 men, will, in fact, be the largest which has ever been mobilized in the country in time of peace. General Brugère, Generalissimo of the French army, will have command of this force, which will comprise ninety-six battalions of infantry, eighty-four batteries of artillery, and eighty squadrons of cavalry. The manœuvres are to be held in the vicinity of Chartres, and the operations will extend from to-day until the 20th inst., when the President will review the troops at the village of Amilly, about six kilometres to the west of the town mentioned. The manœuvres are to be divided into three periods. As the force comprises four army corps and two divisions of cavalry, from to-day to the 10th inst., the forces will operate against one another. General Lonnois and the 4th Army Corps will operate against General Dunop and the 10th Army Corps, whilst General de Longuema and the 5th Army Corps will have as their opponents the 9th Army Corps, the commander of which is General Tauchot. On the 11th the 4th and 10th Army Corps will unite with the 1st division of cavalry, and under the command of General de Negrier will for two days engage with the 5th Cavalry Division and the 5th and 9th Army Corps, whose commander will be General Lucas. Then General Brugère, the Generalissimo, will take over the command of the whole force, and the combined manœuvres will terminate on the 18th.—*Army and Navy Gazette.*

GENERALS AT TEN A PENNY!

A few weeks ago they were quoted at a much higher figure, but that was during the excitement just before the fall of Pretoria. The boom has been followed by the inevitable slump. So, at least, it may be gathered from a case tried the other day in the London County Court. A city firm, it appears, had or-

dered 250 gross of war buttons on which were depicted photographs of the successful generals fighting in South Africa. The delivery was to be made within fourteen days; but it was not. In fact, it was so long delayed, that, when ultimately it took place, the demand, which had been enormous, had subsided. Consequently, the buttons, presentments of the heroes and all, could be, in the words of the defendant, who refused to pay for the belated goods, "bought like sweets at ten a penny!" The Deputy-Judge ruled that the plaintiff, who sought to recover the full price of the buttons, must make a handsome allowance for the depreciation in generals and be content with £30 instead of the £49 claimed. At the same time the Judge good-naturedly sought to comfort the defendant, who even after the reduction had to pay £30 for goods of which he estimated the value to be only £15, with the reflection that, perhaps, the market value of generals would rise again in the glow which would accompany the proclamation of peace.—*United Service Gazette.*

NEW MILITARY EQUIPMENTS, ETC.

The cartridge belt is made from textile material and metal clips. Spring metal clips are held between the two strips of fabric which are connected between the clips by metal plates. The clips are made with scallops along their longitudinal edges. In modifications, (1) the clips are tubes which are connected to the fabric by clips and are each provided with an internal rib to form a stop to the cartridge, (2) the fabric sheaths carry the clips and are connected to a single strip of fabric by means of the semi-cylindrical plates and the rivets, (3) the clips are formed of tubes with longitudinal slits at their ends or with one end internally flanged and (4) the clips are made with their longitudinals overlapping. The pawls by which the belt is fed through the gun are provided with operating fingers by which the pawls can be disengaged from the belt whenever it is desired to withdraw it. In place of the fingers a special tool may be employed, the projections of which act on the short ends of the pawls. The equipment consists of a yoke, the front ends of which are connected together by a breast strap and connected to the waist belt by adjustable straps. The waist-belt at the

back passes through a case which is curved to fit the back and ordinarily serves to carry the minor articles of the kit, but occasionally is also used as a reserve ammunition case, and is connected to the central part of the yoke by an adjustable strap. The knapsack is also curved to fit the back, is stiffened at all parts except in the flaps, rests on the case, and is fastened by straps to buckles on the yoke. Loops are provided on the top of the knapsack for the attachment of the canteen and the great coat.

ACTIVITY AMONG THE FILIPINOS.

General MacArthur reports considerable activity throughout Luzon. Fighting reported in the vicinity of Craig and Estella, Isabella province. Insurgents estimated at 500, probably much exaggerated, but sufficient force to make * * * in district heretofore quiet. In the Ilocan provinces Gen. Young reports numerous small affairs and has called so emphatically for more force that Kingsbury's squadron, 3d Cavalry, and Borden's battalion, 5th Infantry, had been sent to him; the other battalion 5th same destination upon its arrival. The country north of Pasig, including all of Bulacan, is very much disturbed and numerous contacts with small parties throughout that district occur. South of Pasig, including Tayabas province (Luzon), the same conditions obtain. This activity has been anticipated and reported upon previously. Sept. 16 David D. Mitchell (Captain 15th Infantry), 90 men Co. L, 15th Infantry, from Siniloa, Laguna province, attacked insurgent Gen. Cailles, who had 800 men in position at Mavitac, same province. Desperate fighting ensued, which was pushed from the front with great pertinacity by Mitchell across a causeway and through water waist deep. A coöperative attack under George F. Cooke, captain, with 40 men Co. K, 15th Infantry, and 10 men Co. B, 37th Volunteer Infantry, could not reach the enemy's position because of high water in arm of lake, which could not be crossed. The entire country was afloat in consequence of recent rains. This very much impeded offensive action. After an hour and 20 minutes of fighting the command withdrew to Siniloan. Upon renewal operations on the 18th it was found that the insurgents had escaped from Magitac the previous night, most of them no doubt going back into continuous barrios

to appear for the time being or until called into field again. The casualties, which all occurred in Mitchell's command, consisting of 130 men, 4 officers, were: Co. L, 15th Infantry, killed and died of wounds, David D. Mitchell (captain 15th Infantry), George A. Cooper (second lieutenant, 15th Infantry); First Sergt. William Fitzgerald, Sergt. Evremond De Hart, Corp. Laurits Jensen; Privates Edward C. Coburn, George R. Horton, Thomas P. Kelley, Thomas Mulrey, John P. Brink, William L. Banker, Arthur S. Mansfield, Thomas I. Pitcher, Scott L. Smith, Richard Taylor, Edward M. Neal, Fred Duggan, Emanuel Kaufman. Company L, 37th Volunteer Infantry, killed and died of wounds: First Sergt. Thomas P. A. Howe; Privates Edward J. Godahl, George A. Haight, Edward Stallcup, Alfred J. Mueller, James C. West. Wounded, 19. Thirty-three per cent. is profoundly impressive loss and indicates stubbornness of fight, fearless leadership of officers and splendid response of men. Insurgent loss as far as known 10 killed, 20 wounded; among the former is Colonel Fidel.

CHIEF OF TRANSVAAL POLICE FORCE.

Major-General R. S. S. Baden-Powell has been appointed Chief of the new Transvaal police force. His duty will be to organize the force on a military basis and make use of it for the pacification of the country. His visit to Cape Town was undertaken in order that he might consult with Sir Alfred Milner as to the best course of procedure. The citizens of Port Elizabeth have resolved to present the general with a sword of honor. The gallant general was accorded a public reception at Cape Town on Wednesday. The streets were crowded. In reply to an address the general eulogized the Colonial forces, who he said, were responsible for the defense of Mafeking. Whatever critics might say of the strategic insignificance of Mafeking he knew better. He had his orders to hold it, and it was held. General Baden-Powell, writing to the Liverpool Conservative Club in acknowledgment of its generous donation for the relief of the sufferers from the siege of Mafeking, has added, "I fear I do not deserve your goodwill to the extent you offer it, for I was merely the figure-head of a lot of good men who carried the job through."—*Army and Navy Gazette.*

Obituary.

Captain Henry J. Reilly.*

5TH ARTILLERY.

Captain Henry J. Reilly was killed in battle in Pekin, China, on the 15th instant, while in command of Light Battery "F" of the regiment.

For nearly thirty-six years Captain Reilly has been identified with this regiment. Enlisting in Battery "B" on the 22d September, 1864, he was promoted Corporal and Sergeant, and on December 1st, 1866, was commissioned Second Lieutenant. He became a First Lieutenant September 18th, 1868, and Captain January 3d, 1894.

Assigned to the command of Light Battery "F" in August, 1896, Captain Reilly commanded the battery throughout the Spanish-American War, participating in the siege of Santiago, and returning to the United States in August, 1898. The following April he left with his battery, for the Philippine Islands, where he did most efficient service, being in action with the enemy there in seven successful engagements. Upon the breaking out of the present trouble with China, Reilly's battery was selected to accompany the troops first designated for service in that campaign, and has participated in all the marches and battles of the allied armies which resulted in the capture of Pekin and the relief of the foreign legations.

* An obituary of Capt. Reilly was published in the September number of the JOURNAL, but it was taken from a daily paper and contained numerous errors. The above has been furnished by the Adjutant of the Fifth Artillery.

Announcement.

By a Resolution of the Executive Council, at a meeting held June 1st, 1900, officers serving in the

PHILIPPINE ISLANDS, CUBA and

PORTO RICO,

are requested to make contributions of curios, etc., to the

Museum

of the

Military Service Institution.

Anything that may be contributed by officers serving in the Philippines can be sent to

Col. CHAS. A. WOODRUFF,

Ass't Com'y Gen. Subsistence

AT MANILA,

and they will be forwarded by him promptly to the Institution.

The Military Service Institution.

President.

Lieut.-General NELSON A. MILES, U. S. Army.

Resident Vice-Presidents.

Major-General JOHN R. BROOKE, U. S. A. — Bvt. Brig.-Gen. T. F. RODENBOUGH, U. S. A.

Secretary.

Col. WM. H. POWELL, U. S. A.

Treasurer.

Col. M. V. SHERIDAN, Adjt. Genl's Dept.

Asst. Secretary.

Vacancy.

Vice-Treasurer.

Vacancy.

Executive Council.

Term ending 1905.

MILLS, A. L. Col., Supt. Mil. Academy.
MYER, A. L., Major 11th U. S. Infantry.
REBER, SAMUEL, Capt. Signal Corps, U.S.A.
SHERIDAN, M. V., Col. Adjt. Genl's. Dept.
STORY, J. P., Major 7th U. S. Artillery.
WEBB, A. S., Bvt. Major-General (late) U .S. A.

Term ending 1903.

BYRNE, C. C., Col. Med. Dept.
FIEBEGER, G. J., Prof. U. S. Mil Academy.
GILLESPIE, GEO. L., Colonel Corps Engineers.
REILLY, J. W., Lieut -Col. Ord. Dept.
VROOM, P. D., Col. I. G. Dept.
WILSON, C. I., Col, Pay Dept.

Term ending 1901.

BARRIGER, J. W. Bvt. B.-G. U. S. A.
CLOUS, J. W., Lieut.-Col. J. A. General's Dept.
HEIN, OTTO L., Lieut.-Col. Com. Cadets, U.S.M.A
BREWERTON, H. F., Major U. S. A.
KNIGHT, J. G. D., Major Corps Engineers.
MOORE, JAS. M., Col. Q. M. Dept.
APPLETON, DANIEL, Bvt. Brig. Gen. N.G.,N.Y.

Finance Committee.
Gen. BARRIGER.
Col. POWELL.
Col. REILLY.

Library Committee.
Major KNIGHT.
Major STORY,
Capt. REBER.

Publication Committee.

Colonels POWELL and CLOUS, Major KNIGHT and Capt. REBER,.

Branches

are established at West Point, Fort Leavenworth and Vancouver Barracks.

Membership dates from the first day of the calendar year in which the "application" is made, unless such application is made after October 1st, when the membership dates from the first day of the next calendar year.

Initiation fee and dues for first year $2.50, the same amount for five years subsequently. After that two dollars per year. This includes the Journal.

NOTE.—Checks and Money Orders should be drawn to order of, and addressed to, "The Treasurer Military Service Institution," Governor's Island, New York Harbor. Yearly dues include Journal.

Changes of address should be reported promptly.

Prize Essay—1900.

I.—The following Resolution of Council is published for the information of all concerned:

Resolved, That a Prize of a Gold Medal, together with $100 and a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest, the subject to be selected by the Executive Council, and $50 to the first honorably mentioned essay. The Prizes will be awarded under the following conditions:

1. Competition to be open to all persons eligible to membership.

2. Each competitor shall send three copies of his Essay in a sealed envelope to the Secretary *on or before January* 1, 1901. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.

3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate *the Essay deemed worthy of the prize;* and also in their order of merit those deserving of honorable mention.

In determining the essay worthy of the prize, the Board will be requested to consider its professional excellence, usefulness and valuable originality, as of the first importance, and its literary merit as of the second importance. Should members of the Board determine that no essay is worthy of the prize, they may designate one or more essays simply as of honorable mention; in either case, they will be requested to designate one essay as first honorable mention. Should the Board deem proper, it may recommend neither prize nor honorable mention. Should it be so desired, the recommendation of individual members will be considered as confidential by the Council.

4. The successful Essay shall be published in the Journal of the Institution, and the Essays deemed worthy of honorable mention shall be read before the Institution, or published, at the discretion of the Council.

5. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held November 11, 1899, for the Prize Essay of 1900, is

"*THE ORGANIZATION OF A STAFF BEST ADAPTED FOR THE UNITED STATES ARMY.*"

III—The gentlemen chosen by the Council to constitute the Board of Award for the year 1900 are:

LIEUT. GENERAL JOHN M. SCHOFIELD, U. S. A.

GENERAL C. B COMSTOCK, U. S. A.

PROF. G. J. FIEBEGER, U. S. MILITARY ACADMEY.

GOVERNOR'S ISLAND, N. Y.
November, 1900.

WM. H. POWELL,
Secretary.

Announcement.

The Military Service Institution desires a few copies of numbers 4 and 79 of the Journal.

Will the Members who have any of these numbers to dispose of, please communicate with the Secretary, Governor's Island, New York City.

All Officers

On Foreign Stations

Will please notify the Secretary of the Military Service Institution

The Address

to which they desire the JOURNAL to be delivered.

61060.